THE

BUTTERFLIES

OF

INDIA, BURMAH AND CEYLON.

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THE

BUTTERFLIES

OF

INDIA,

BURMAH AND CEYLON.

A DESCRIPTIVE HANDBOOK OF ALL THE KNOWN SPECIES OF RHOPALOCEROUS LEPIDOPTERA INHABITING THAT REGION, WITH NOTICES OF ALLIED SPECIES OCCURRING IN THE NEIGHBOURING COUNTRIES ALONG THE BORDER; WITH NUMEROUS ILLUSTRATIONS.

BY

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VOLUME III.

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PREFACE TO VOL. III.

The first volume of "The Butterflies of India, Burmah and Ceylon" was published in August, 1883, the second in October, 1886, the third is now issued after about the same interval of rather over three years from the second as intervened between the second and the first. These long intervals are much to be regretted, but they have proved to be unavoidable. To European residents in India an occasional holiday is necessary for health's sake alone, and hence, in accordance with the old saw that "All work and no play makes Jack a dull boy," I spent six months in Kashmir during the summer of 1887, during which period my work on this book necessarily came to a standstill. But, excluding this interval of rest and recreation, I have worked steadily and continuously at this volume during my leisure time, usually devoting to it at least three or four hours, and often more, on every day since Volume II was issued. The present volume represents 1,400 sheets of foolscap manuscript, the passing of which through the press has alone taken more than a year; the whole of the MS. having been placed in the printer's hands on New Year's Day, 1889. I mention these facts because surprise has been expressed that the production of a single volume should occupy so long a time.

I have still deeply to regret that Colonel G. F. L. Marshall, R.E., has been able, mainly owing to ill-health, but partly from pressure of official duties, to do so little to the work. He was enabled, however, before he left India on leave, to give me considerable preliminary assistance in the preparation of the MS., for which I now tender him my grateful thanks.

To Colonel A. M. Lang, R.E., I am much indebted for considerable help with the Introduction to the volume, and in the construction of the Key to the Genera. Very unfortunately for me he has retired from the service and left India, and hence is no longer at hand to assist me with his great and valued experience.

Professor J. Wood-Mason, the Superintendent of the Indian Museum, has most kindly read through a final proof of every page in the volume, from his great zoological knowledge and experience rendered me much help, and allowed me the freest use of the collections of specimens and of books in the institution under his direction; all of which I hereby gratefully acknowledge.

It remains only for me to express my most sincere thanks to the following gentlemen for the valuable assistance rendered during the progress of this volume. In the first position amongst these I place my late dear friend Otto Möller of Tukvar, Darjiling, than whom a more generous man never lived, and whose entire collection, together with the stores of knowledge he had acquired during the many years he had studied the butterflies of Sikkim and Bhutan, was unreservedly placed at my service. His untimely death a year ago is a great loss to entomology, and an irreparable one to me. Messrs. A. V. Knyvett, G. C. Dudgeon, and J. Gammie have most kindly allowed me the use of any specimens in their Sikkim collections that I required, especially the first-named, who, in addition to his Sikkim collection, possesses a splendid series of the butterflies of the little-known neighbouring country of Bhutan. To the Rev. Walter A. Hamilton my best thanks are due for the immense number of specimens

that he has given me from the Khasi Hills, where he has employed many native collectors for the past two or three years, during which period he has discovered many species new to science (which I have had the pleasure of describing), besides obtaining beautiful series of many species that had hitherto been very rarely met with in collections. He has carried his generosity in many instances so far as to present me with unique specimens. Mr. P. W. Mackinnon too has aided me largely by the gift of splendid series of specimens from Masuri and from the inner ranges of the Western Himalayas extending up to the sources of the Ganges and Jumna rivers. For the gift of many butterflies, larvæ, and pupæ, I am indebted to Mr. E. A. Minchin, who has shewn a remarkable aptitude for the discovery of the two latter stages, especially in the family *Lycænidæ* with which this volume deals, nearly all the larvæ and pupæ described therein for the first time having been discovered by him at Barrackpore near Calcutta. Unfortunately for me, he was only able to help me in this way for about a year, after which he left India for Oxford. Colonel C. Swinhoe also has very kindly allowed me the use of his collection of *Lycænidæ*, which is especially rich in species from the Bombay Presidency. Lastly, I have to thank Mrs. Wylly, Messrs. C. G. Blathwayt, E. H. Aitken, G. F. Hampson, J. Davidson, F. Fairlie, E. E. Green, B. Noble, and W. Davison for the gift of many specimens.

To Dr. G. King, C.I.E., the Superintendent, and to Dr, D. Prain, the Curator of the Herbarium, of the Royal Botanical Garden, Calcutta, who have most kindly named most of the plants on which the larvæ described in this volume feed ; as well as to Dr. A. Forel, of Geneva, who has carefully named the various species of ants that attend many of the larva ; my thanks are also tendered.

I propose, immediately after this volume is published, to take up the next, which will contain the family *Papilionidæ*, and I trust that I may be able to finish it in less time than its predecessors have taken.

LIONEL DE NICÉVILLE.

13, KYD STREET,
CALCUTTA. *January*, 1890.

FAMILY 3.—LYCÆNIDÆ. (FRONTISPIECE, PLATES XXV TO XXIX INCLUSIVE.)

Lycænida, Leach, Edinb. Encyc., vol. ix, p. 129 (1815); *Lycænidæ*, Stephens, Illustr. Brit. Ent., Haust., vol. i, p. 74 (1827); id., Westwood. Introd. Mod Class. Ins., vol. ii, p. 358 (1840); idem, id., Gen. Diurn. Lep., vol. ii, p. 468 (1852); id., Bates, Journ. Ent., vol. i, p. 220 (1861); idem, id., vol. ii., p. 177 (1864); id., Trimen, Rhop. Afr. Austr., p. 217 (1866); idem, id., South-Afr. Butt., vol. ii, p. 7 (1887); id. Moore, Lep. Cey., vol. i, p. 69 (1881); id., Distant, Rhop Malay., p. 193 (1884); *Erycinidæ* (part), Swainson, Lardner's Cab. Cyc., pp. 86, 94 (1840); *Lycenites*, Blanchard, Hist. Nat. des Ins., vol. ii, p. 342 (1845); *Polyommatidæ*, Swainson, Phil. Mag., second series, vol. 1, p 187 (1827); *Polyommates*, Boisduval, Hist. Gén. des Lép. Amer. Lep., p. 2 (1829); *Euménides* and *Lycénides*, id., Sp. Gén., Lep, vol i, pp. 163, 164 (1836); *Erycinidæ* (part), Swainson, Hist. and Nat. Arrang. Ins, p. 94 (1840); Vermiform Stirps, Horsfield, Cat Lep E. I. C., pp. 20, 38, 64 (1828).

"FORELEGS, slender and evidently smaller than the rest, but nearly alike in the sexes, used for walking, scaly; tarsus of the *male* long, exarticulate; that of the female jointed like in the hindlegs. FOREWING, with the subcostal nervure emitting only two, or three [very rarely four] branches; the discoidal cell generally narrow owing to the distance between the costal and subcostal nervures; [the upper disco-cellular nervule wanting]. All but one or two of small size. BODY, rather slender [except in the genus *Liphyra*, Westwood]; *antennæ*, short, often ringed with white, with an elongate distinct club; *palpi* [usually] elongate, terminal joint slender, horizontal, and nearly naked. HINDWING, scarcely channelled to receive the abdomen, often with one or more slender tails; præcostal nervure apparently wanting." (*Marshall* and *de Nicéville*, Butt. of India, vol. i, p. 18.)

"INSECTS [usually] of small size. BODY, generally comparatively slender. HEAD, moderate-sized, often with a small tuft of hairs at the base of the antennæ. *Eyes* often hirsute. *Antennæ* generally shorter than half the length of the costa of the forewing, often ringed with white, and terminated by an elongated distinct club. *Palpi* [very variable in length, often longer in the female than in the male, extremely short and small in some genera, *i.e.*, *Rapala* and *Liphyra*, very long in other genera, *i.e.*, *Cheritra*, *Drupadia* and allies, and *Loxura*] rather elongate, terminal joint slender, horizontal, nearly naked. *Forelegs* evidently smaller in proportion than the rest, nearly alike in size and shape in the two sexes, not [very rarely] brush-like in the males, but furnished with a long exarticulate tarsus, having several curved hooklets at the tip, distinct from the ungues. Forelegs of the female with the tarsus articulated like the hindlegs. *Hindlegs* slender, scaly; hind tibia with only one pair of spurs, sometimes very minute; ungues minute, scarcely exserted. FOREWING, with two or three branches only [rarely four] to the subcostal nervure. Discoidal cell [closed], generally narrow, owing to the distance between the costal and subcostal nervures; [the upper disco-cellular nervule wanting]; wings closed over the back when the insect is at rest. HINDWING, with the outer margin often produced into one or more slender tails near the anal angle. Abdominal margin scarcely forming a groove for the reception of the abdomen. Præcostal nervure apparently wanting; discoidal cell closed by very slender disco-cellular nervules."

"LARVA, short, broad, flattened [often arched], usually naked, [usually] resembling a wood-louse; head very minute; occasionally finely hairy, or with the surface wrinkled, [rarely furnished with long fleshy tubercles, or with bunches of short bristles; also with certain organs on the eleventh and twelfth segments, that on the eleventh when present exuding a liquid which is probably sweet and always eagerly sought by attendant ants; those

on the twelfth when present consisting of two more or less brush-like protrusible tentacles, the use of which is uncertain]. PUPA, short, thick, obtuse at each end; [usually] attached by the tail, and girt by a silk thread across the middle of the body;" [sometimes suspended by the tail only and hanging quite free as in the family *Nymphalidæ* and most of the genera of the family *Lemoniidæ*; sometimes the pupa is quite unattached and lies on the surface of the ground, or forms a weak cocoon just below the surface; very rarely the pupa is almost free and assumes a more or less upright position amongst the stems of its food-plant, spinning a few threads to secure it in position. The pupa is usually naked, sometimes covered with short hairs, or bristles; sometimes it has bunches of very long hairs, especially on the abdominal region.] (*Westwood*, l. c. in Gen. Diurn. Lep.)

From the preceding diagnosis it will be seen that the organs of primary importance in separating the *Lycænidæ* from the other families of the Rhopalocera are the forelegs.* The differences in these organs are however correlated with those in other structural details, and amongst these the venation of the wings naturally invites study, as offering important points of difference among genera and species in all Lepidopterous groups. Here it will be seen that, while the subcostal nervure of the hindwing resembles that of all the *Nymphalidæ* and the *Libythæinæ*, and two species of the genus *Dodona* of the *Nemeobiinæ*, in giving off its first branch (or first subcostal nervule) before the apex of the discoidal cell, the corresponding nervure in the forewing differs in nearly all the genera of the *Lycænidæ* from those of the preceding families in having less than four branches or subcostal nervules. There are three aberrant genera occurring within the strict geographical limits of this work—*Zarona*, mihi, *Dacalana*, Moore, and *Liphyra*, Westwood—and one in the Malay Peninsula—*Deramas*, Distant—which resemble the *Nymphalidæ* and *Lemoniidæ* in having four subcostal nervules to the forewing (exclusive of the terminal portion of the subcostal nervure often called an additional subcostal nervule); and in three other strictly Indian genera—*Amblypodia*, Horsfield, *Iraota*, Moore, and *Zesius*, Hübner,—and one Malayan genus—*Neocheritra*, Distant,—the males have four subcostal nervules, while the females have only three. These variations, however, in the number and arrangement of the subcostal nervules of the forewing do not by themselves serve (as will be shown further on) for defining natural groups in further subdividing the family, though in conjunction with other features they are useful in classification. The *Lycænidæ* differ from the *Nymphalidæ* and *Lemoniidæ* in having no upper disco-cellular nervule to the forewing; the middle disco-cellular nervule always arises either from the point where the upper discoidal nervule is given off from the subcostal nervure or from the latter vein itself a little beyond its base: the family is also aberrant in lacking entirely the præcostal nervure of the hindwing, which is always found in the previous families.

A very curious structural feature occurs in both sexes of all species of six genera, and in one species of one genus, in that the upper discoidal nervule of the forewing is given off from the subcostal nervure *beyond* the apex of the discoidal cell, the like of which occurs in no genus of the families treated hitherto in this work. These genera are as follows:—*Gerydus*, Boisduval; *Paragerydus*, Distant; *Logania*, Distant; *Poritia*, Moore, one species; *Zephyrus*, Dalman; *Enaspa*, Moore; and *Liphyra*, Westwood. Mr. Scudder shews that this abnormal neural character occurs in one North American species of *Lycænidæ*, the *Feniseca tarquinius* of Fabricius, as I learn from pl. xxxix, fig. 24, of his "Butterflies of the Eastern United States and Canada." Mr. W. H. Edwards—erroneously, I think, as it does not appear to

* It will be noted that the *Gerydus* group is abnormal in respect to its legs. It may also be observed that Mr. Roland Trimen states that three genera of South African butterflies—*Deloneura*, Trimen; *Arrugia* Wallengren; and *Lachnocnema*, Trimen—have completely articulated and clawed fore-tarsi in the male; and that in the Indian genus *Taraka*, Doherty, MS., the fore-tarsi of both sexes are without articulations, and have the claws basally united. Of *Deloneura*, Mr. Trimen writes that it is unique amongst butterflies, in that it has no middle disco-cellular nervule to the forewing, the upper and lower discoidal nervules having a common origin. This very curious feature is also found in the Indian genus *Iraota*, Moore. The genus *Lachnocnema* is, perhaps, equally aberrant in another way, as the legs (femora, and, especially, the tibiæ,) are clothed with "very long extremely dense woolly hair, hiding basal part of tarsi."

possess a præcostal nervure to the hindwing, a distinguishing character in the family *Lemoniidæ*, and has also the subcostal nervure of the hindwing branching *before* the apex of the discoidal cell—considers this butterfly to belong to the subfamily *Nemeobiinæ*.

If the subcostal nervules of the forewing be used for the division of this family into primary groups, four such divisions may be formed : (1) the first with two : (2) the second with three : (3) the third with three in the female and four in the male : (4) the fourth with four in both sexes. This arrangement, although it would seem at first sight to be natural, as based on structural characters, which in many cases appear to be of real value in forming natural groups, is found in this family to separate some obviously closely allied genera, and to bring together others which do not seem to have natural affinities to one another. It may, however, be of some interest and use to tabulate the groups which would be formed under this system :—

(1)	(2)		(3)	(4)
Neolycæna.	Gerydus.	Acesina.	Amblypodia.	Zarona.
Thecla.	Paragerydus.	Mahathala.	Iraota.	Dacalana.
Thamala.	Allotinus.	Curetis.	Zesius.	Liphyra.
Hypolycæna.	Logania.	Zephyrus.	3	3
Chliaria	Poritia.	Euaspa.		
Zeltus	Pseudodipsas.	Chætoprocta.		
Rathinda.	Pithecops.	Chrysophanus.		
Horaga	Neopithecops.	Ilerda		
Catapœcilma.	Spalgis.	Arrhenothrix.		
Drupadia.	Taraka.	Camena		
Eooxylides.	Megisba.	Maneca.		
Yasoda	Lycæna.	Mota.		
12	Chilades.	Aphnæus.		
	Cyaniris.	Tajuria.		
	Zizera.	Suasa.		
	Azanus.	Charana.		
	Orthomilla.	Cheritrella.		
	Lycænesthes.	Neomyrina.		
	Niphanda.	Ticherra.		
	Talicada.	Cheritra.		
	Everes.	Biduanda.		
	Nacaduba.	Loxura.		
	Jamides.	Drina.		
	Lampides.	Lehera.		
	Catochrysops.	Araotes.		
	Tarucus.	Deudorix.		
	Castalius.	Zinaspa.		
	Polyommatus.	Hysudra.		
	Surendra.	Rapala.		
	Apporasa.	Bindahara.		
	Thaduka.	Virachola.		
	Arhopala.	Sinthusa		
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From the above list it will at once be seen that the separation of the *Nymphalidæ* and *Lemoniidæ*, with their four-branched subcostal nervure, from the *Lycænidæ*, as possessed of less than four subcostal nervules, holds good generally ; in eighty-two Indian genera only six genera forming exceptions. These six genera, however, are manifestly aberrant, five of them being slightly abnormal offshoots of normal Lycænid groups, while the sixth, *Liphyra*, is altogether peculiar, and scarcely finds a suitable location in this family of small and delicate insects, from which it is separated by its comparatively large size, robust and short body, stout antennæ, and thick and moth-like texture of wing, with large loosely-attached scales. I may add that I have devoted especial and careful study to the neuration of the wings of this family, and have tested the diagnoses of all its genera by microscopic examination of bleached and mounted specimens of the wings of both sexes of one or more species in each genus whenever procurable, often sacrificing unique specimens in my collection for this purpose. All variations in neuration have been utilized in discriminating genera, species, and sexes, and in constructing the "key," but, as already observed, the differences in neuration, though considerable and numerous, do not offer characters which are universally and constantly applicable for primary divisions, and they are consequently of only secondary value in the classification in this family.

After the veins, it is probable that the caudate appendages or "tails" with which so many of the *Lycænidæ* are furnished are the next most important structural characters to

be observed in the wings. In this there is very great diversity; many genera possess no tails whatever; two genera of Indian *Lycænidæ* (*Nacaduba* and *Arhopala*) possess some species which are tailed, others which are tailless; two genera exist (*Megisba* and *Nacaduba*) in which I believe the same species to be furnished with, or sometimes to lack, a single filamentous tail to each hindwing. Numerous genera have one short tail, others have two short tails, others again have two tails of different length, and sometimes it is the inner one, sometimes the outer one, which is much the longer; lastly, some genera have three tails, and in these the middle tail is usually the longest. The number of the tails is variable in the sexes also. *Iraota* and *Surendra* have one tail in the male, two in the female, while *Zesius* has two tails in the male, and three in the female. In the genera *Thamala*, *Lehera*, and *Araotes*, the males have one short tail, which is greatly elongated in the female. The length and breadth of the tail is as variable as its presence or absence, or the number found in one wing. In *Lycænesthes* the tails appear to be three in number, but these are very minute, and are nothing more than a few cilia which are rather more elongated than the rest, and are very liable to be broken off or otherwise destroyed. In a very large number of genera the tail is only about an eighth of an inch in length, and filiform; in a few genera it is very long indeed, a full inch in length, comparatively broad, and highly ciliated; while one genus (*Zeltus*) has two such tails to the hindwing, one of which is, however, much shorter than the other. There is almost every gradation amongst Indian *Lycænidæ* between those species with the shortest and those with the longest tails. In the species with long tails, it will often be found that the tails are twisted at the ends. No other family of butterflies can shew such diversity of tails as can the *Lycænidæ*.

The "anal lobe" of the hindwing is usually an important structural character; some genera lack it altogether, some have it very small, while others again have it very large: it perhaps reaches its greatest development in the genus *Bindahara*; lastly, the genus *Arhopala* shews no trace of it in some species, has it very small in others, and moderately large in others again.

It is thus manifest that, in the "caudal" and "lobular" appendages of the hindwing, the *Lycænidæ* offer very variable features, which might be expected to offer characters of primary importance; and to a considerable extent this is so, the presence and absence of tails, their length, form, &c., serving to separate really natural groups. Here again, however, we must allow for many deviations from a strict uniformity in genera and in the characters appertaining to groups, and such deviations must be admitted as occasional and really unimportant aberrations. In combination with these appendages, the general form and the outline of the hindwing must be studied, as these also, though not perhaps susceptible of very close and minute definition, appear to be generally constant in the main groups, and on these Mr. Distant has relied for the determination of two out of three of his divisions of the *Lycænidæ* in his magnificent "Rhopalocera Malayana," *viz.*:—

Posterior wings without filamentous tail-like appendages near the anal angle ... CURETARIA.
Posterior wings with minute filamentous or prominent tail-like appendages near the anal angle ... .
Posterior wings convex, about as broad as long ... ... CASTALARIA.
Posterior wings more or less elongate, distinctly longer than broad ... ... APHNARIA.

I should have been glad to have adopted these primary divisions, but am unable to do so, as they are mainly based on the presence or absence of tails to the hindwing, and, as I have shewn above, three Indian genera, which also occur in the region treated in Mr. Distant's work, *viz.*, *Megisba*, *Nacaduba*, and *Arhopala*, have both tailed and tailless species.

In the divisions or groups adopted in this work, the form of the hindwings has been utilized, as correlated with the style of the caudal appendages and with other structural features, and has been found to help in marking natural groups, and forming a natural sequence, which is generally in accord with that adopted by Mr. Distant. The *Gerydus* group has

short rounded hindwings without tails; the *Poritia* group has rather produced hindwings and no tails, the species being often very brilliantly coloured on the upperside of the male; the tailless "Blues" or *Lycæna* group have short hindwings, of which the outer margin and anal angle are entire and smoothly rounded; the tailed "Blues" or *Polyommatus* group differ only in the possession of a short and delicate filamentous tail at the end of the first median nervule; the *Amblypodia* group presents a more or less elongated form of hindwing with some variety in the shape and caudation; the *Thecla* group has also elongated hindwings, often considerably produced posteriorly and showing a tendency to a lobe, in addition to their one or two tails, this group being the largest, and containing a very heterogeneous collection of genera; the *Myrina* group differs from the proceeding in having two very long ciliated tails with a well-formed and lobe; the *Horaga* group is a small coterie of genera with hindwings shaped much as in the last, but provided with three short tails; the *Loxura* group contains only two genera, which have a greatly produced hindwing ending in a very long tail curled at the end; the *Deudorix* group has a produced and elongated hindwing, usually with a well-formed anal lobe, and one tail, which is very variable in length, many of the genera being further noticeable for possessing in the males, on the upperside of the hindwing below the costa, a curious impressed scale-shaped or "blister-like" sexual mark. The genus *Liphyra* stands distinctly apart in almost every character from the rest of the family.

The secondary sexual characters (often called "sex-marks," "scent-organs," "male-marks," &c.), which are found in many different positions and of very variable structure and nature on the wings of male butterflies of the *Lycænidæ*, are of high interest, and have been carefully noted by me in the diagnoses of the genera which follow. Dr. Erich Haase has devoted considerable attention to "The Scent Apparatus of Indo-Australian Butterflies," and in Iris, vol. i. p. 316, *et seq.*, gives a description of some of these structures as occurring in the *Lycænidæ*. The androconia or "battle-door scales," which are found scattered amongst the ordinary scales on the wings of male butterflies, require to be carefully searched for and to be examined under a microscope. These I have not studied, but they doubtless occur in a very large proportion of the species. The secondary sexual characters to which I more particularly refer are considerable patches of scales which are quite differently formed from those of the rest of the wing, and tufts of long hairs which are placed in very diverse positions, both of which can be easily seen with the naked eye. I refer the reader to detailed descriptions of these in their proper place, and I give below a list of the Indian genera of *Lycænidæ* in which they are found :—

On the forewing only.	*On the hindwing only.*	*On both wings.*
Iraota.	Poritia.	Dacalana
Thecla.	Maneca.	Arrhenothrix.
Thamala.	Cheritra.	Camena.
Hypolycæna.	Biduanda.	Drupadia.
Horaga (some).	Yasoda.	Rapala
Eooxylides.	Hysudra.	Bindahara.
		Virachola.
		Sinthusa.

These genera may again be arranged with reference to the structure of these secondary sexual characters, also as to the genera possessing one or both characters, thus :—

With peculiarly-formed scales only.	*With long tufts or pencils of hairs only.*	*With both patches of scales and tufts of hairs.*
Thecla.	Poritia.	Dacalana.
Maneca.	Iraota.	Arrhenothrix.
Thamala.	Cheritra.	Camena.
Hypolycæna.		Rapala.
Horaga (some).		Virachola.
Biduanda.		Sinthura.
Drupadia.		
Eooxylides.		
Yasoda.		
Hysudra.		
Bindahara.		

The other more important organs, such as eyes, antennæ, palpi, &c., though varying to some extent in the several genera of this family, do not offer striking characters for classification or for special notice, though they will be referred to in the diagnoses of the

different genera. The eyes are notched on the inner margin to give room for the sockets in which the bases of the antennæ are inserted ; they do not rise above the general contour of the surface of the head ; they are sometimes quite naked, sometimes have a portion at least of their surface sparsely covered with short exceedingly delicate hairs ; the use of these hairs is quite unknown. The antennæ, including the club, are straight, usually formed of very distinct white-ringed joints. The antennæ are very variable in length, in many Indian genera they are considerably less than half the length of the costa of the forewing ; in the majority they are about equal to half the length of the forewing, in very few are they more than half the length. The club of the antennæ is most variable ; in the majority of the genera it is well-formed, in *Amblypodia* there is hardly any thickening towards the apex of the antennæ however, and in many others the swelling is very slight and gradual. The antennæ do not seem to serve to separate groups with sufficient exactness, though the *Amblypodia* group are generally characterised by short antennæ, gradually incrassated from base to tip without a distinct club. The palpi are perhaps even more variable than the antennæ. They are smallest of all in *Liphyra*, very small indeed in *Rapala*, then gradually increasing in length till a maximum is reached in *Loxura* and *Yasoda*. They often vary in length in the sexes ; when this is the case, they are always longer in the female than in the male. The maxillæ or haustella of the *Lycænidæ* are very short ; as a rule the butterflies do not live much on the honey of flowers, so have no use for a long trunk.

The larvæ and the eggs of the *Lycænidæ* are distinctive, and their special forms, &c., correlated to the peculiar features of the imago, denote the reality of the *Lycænidæ* as a well-defined and separate family of the Rhopalocera, though some species of the *Lemoniidæ* are obviously closely allied to the *Lycænidæ* in all stages ; indeed Mr. S. Scudder unites the two families, as I learn, from the first parts of his most exhaustive and magnificent work, "The Butterflies of the Eastern United States and Canada," which have just reached me. It is probably in the characters of the earlier stages of the *Lycænidæ* that success in a thoroughly satisfactory classification of the family may best be sought ; but the materials at our disposal are not yet sufficient for this to be attempted at present. In the order in which I have arranged the Indian genera, I have striven to place them in as natural a sequence as possible, judging from the *facies* and structure of the imagines, but I am painfully conscious that my efforts in this direction have only met with partial success.

Mr. W. Doherty, who has devoted much time and attention to the study of the eggs of butterflies, has divided the family *Lycænidæ* into several subdivisions, chiefly based on their structure, the diagnoses of which I give below :—

"LYCÆNIDÆ.—Eggs hard, small, numerous, much wider than high, reticulate, with a whitish, calcareous (?) accretion, forming an asymmetrical network of tetragons."

"Subdivisions of the *Lycænidæ*."

"*Amblypodinæ*.—Egg at least half as high as wide, convex above, widest well above the base, with numerous delicate intersecting ridges bearing acute spines at their crossing."

"*Deudoriginæ*.—Egg similar, with short truncate spines."

"*Theclinæ*.—Egg fully half as high as wide, convex above, widest close to the base, with coarse, minutely vesicular reticulations, forming large irregular pits over the surface, and bearing broad, depressed tubercles at their intersection."

"*Lycæninæ*.—Egg less than half as high as wide, concave above, "turban-shaped" (as Mr. Scudder calls it), widest above the middle, reticulations coarse and asymmetrical."

"*Poritinæ*.—Egg hexahedral, otherwise similar. This is the only egg known to me that is not round in horizontal section."

"*Gerydinæ*.—Egg less than one-third as high as wide, delicately and sometimes obsolescently reticulate, sometimes carinate, flat above and below." (*Doherty*, Journ., A. S. B., vol. lv, pt. 2, p. 110, 1886.)

I have often examined the eggs of several species of *Lycænidæ* under the microscope, and realized what beautiful objects they are; but in a very few cases only have I made detailed descriptions of them, and my investigations in this direction are insufficient to enable me to form groups based on the structure of the egg.

Mr. Scudder states that "tiarate or echinoid eggs are confined to and include all of the *Lycænidæ*, but in one genus, *Heodes*,* the base of the egg is broadened to such an extent that it is only by sufferance that it can be classed here; it is rather demi-echinoid; the surface of tiarate eggs is nearly always broken up into cells of varying size separated by distinct heavy walls, which are sometimes of uniform height throughout, at others produced at the angles into tubercles presenting, on close examination, a very different effect." (Butt. of the East. U. S., p. 3.) "The tiarate eggs are very beautiful objects, often reminding one of a miniature sea-urchin without spines, and are characteristic of the *Lycænidæ*, though some of them incline towards the hemispherical form, and all, without exception, are reticulate. In these the surface is never ribbed, but generally covered with a heavy network of deep pits, whose bounding walls are rather coarse and rough. The eggs of the Parnassians [a genus of the *Papilioninæ*] resemble them closely." (l. c., p. 191.) He also notes that the *Lycænidæ*, alone amongst butterflies, as far as is known, sometimes pass the winter in the egg state, the eggs being laid, not on the leaves or very young shoots, as is usually the case in butterflies, but on the stem of their food-plant or in some crevice in the bark.

Mr. Trimen (South-African Butterflies, vol. ii, p. 10) describes the larvæ of the *Lycænidæ* as follows: "Shaped like wood-lice [onisciform] for the most part, are extremely sluggish, and look in many cases more like a *Coccus* or some vegetable excrescence than caterpillars. Some of them are smooth, many clothed with a short down, some with fascicles of short bristles or regularly-disposed tubercles, and a few hairy generally. Several are regularly corrugated dorsally, and others prominently humped in one or two places." The larva of the genus *Spalgis*, Moore, is most aberrant, being furnished with long irregular divergent processes or tubercles; while the genus *Rathinda*, Moore, has a very similar larva, but the tubercles appear to be arranged more regularly, while some are much shorter than others. The genus *Curetis*, Hübner, has a larva quite *sui generis*; it is anteriorly somewhat humped, and the twelfth segment is furnished with two long upright hollow cylindrical processes or "pillars," from which, at the will of the animal, can be thrust forth long tentacles, of which more will be said further on. Some larvæ of *Lycænidæ* are scutate, being furnished with a hard flattened shield on the dorsal region of the three last segments, which is used by the larvæ to plug up the holes in the fruits on the interior of which they live. Doubtless, hereafter other curious forms of larvæ of this family will be found; up to the present the transformations of comparatively few species are known. The majority of them feed on the young leaves, buds, and flowers of trees, bushes, and low-growing plants; three genera—*Lampides*, *Virachola* and *Deudorix*—of Indian *Lycænidæ*, however, feed on the interior of fruits of several different kinds; lastly some feed upon the seed-pods of leguminous plants; these latter larvæ have very long necks, so that they can reach far into the interior of the pods with their mouths and thus scoop out the contents, while the greater portion of their body remains outside.

Some species of *Lycænidæ* larvæ are furnished with certain organs which are found in no other larvæ of Lepidoptera as far as I am aware. These organs are certainly not found in all *Lycænidæ* larvæ, but why some species should be so furnished, while others are not, I can offer no confident opinion. I have, however, a theory that these organs exist for the protection of the larvæ, and that, where they are absent, other means of protection exist. In the genus *Curetis*, Hübner, I have found that the larvæ are furnished with one set of organs mentioned above, which are extremely large and well-developed, being

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* The species that Mr. Scudder includes under this genus have hitherto always been considered to belong to the genus *Chrysophanus*, Hübner.

larger than in any other *Lycænidæ* larvæ known to me, while the third organ described below is entirely absent. This latter organ consists of an oval opening on the dorsal line of the eleventh segment with lips like a mouth; these lips can, at the will of the larvæ, be somewhat protruded, and a drop of sweet liquid exuded. On the twelfth segment are two other organs, one on each side, in the subdorsal region. In *Curetis*, which does not possess the mouth-like organ on the eleventh segment, these two organs are of very great size and are much more developed than in any other *Lycænidæ* larvæ known to me. Each organ consists of a tall "pillar" as described above, from which, when the larva is touched or frightened, is instantly protruded a long tentacle furnished at its head with a brush of long parti-coloured hairs as long as itself; these hairs open out into a rosette, and the tentacle is whirled round with immense rapidity producing a most curious effect. I believe the *Curetis* larvæ use their tentacles solely to frighten away their enemies, the worst of which are Ichneumon flies. I think it probable that these organs were first developed, and the mouth-like opening on the eleventh segment came into existence at a later date. This latter organ with its sweet-tasting liquid exudation is greatly affected by ants of very many different species, who in return for the food they obtain from the larvæ act as their most efficient guardians. I have found as many as four species of ants attending one species of larva. Ant-tended larvæ are most easily found by looking for the ants; the larvæ are usually coloured like the leaves, buds, flowers, and seed-pods on which they feed, and are for other reasons not easily seen, but the restless red or black-coloured ants are very conspicuous. *Curetis* larvæ are not attended by ants and have not the organ on the eleventh segment, whence the necessity of having the organs on the twelfth segment in a highly developed condition. In other larvæ which are attended by ants the organs on the twelfth segment are smaller than in *Curetis*, and are, I believe, gradually aborting, because, as far as I can see, the ants having constituted themselves their defenders, there is no further use for them for defence, but Mr. Edwards possibly correctly surmises that in their aborted condition they serve as signals to the ants to examine the eleventh segment for the sweet fluid to be emitted by the larvæ. M. Guenée, in 1867, appears to have been the first* to discover these organs, which he found in *Polyommatus bœticus*, Linnæus, and he described and figured them. But little notice was taken of the discovery till Mr. W. H. Edwards rediscovered them, and, in "The Canadian Entomologist," vol. x, p. 1 (1878), gave a long account of the organs as found in *Lycæna* (*Cyaniris*) *pseudargiolus*, Boisduval and Leconte, a North-American butterfly, with a woodcut of the posterior end of the larva. This account he greatly supplemented in the second volume of his superb work "Butterflies of North-America," in which much additional information is given. Mr. W. Doherty (Journ. A. S. B., vol. lv, pt. 2, p. 112, 1886) has recorded some interesting observations on the same subject, as also has Mrs. Wylly (Journ. Bomb. Nat. Hist. Soc., vol. iii, p. 164, 1888). Not only do the ants attend the larvæ from their very first and smallest stages (I have found ants attending larvæ of *Rapala schistacea*, Moore, only an eighth of an inch long) till they are full grown, but they often cause the larvæ to change to pupæ within their nests, in this manner protecting them from harm from the time they emerge as minute caterpillars from the egg to the hour they assume the perfect form and fly away. Indian collectors should devote at least some of their time and attention to finding out and recording the transformations of the *Lycænidæ* especially, and should note if the larvæ are attended or not by ants, and, if so, by what species of ants; also whether or no they possess the special organs described above. The tentacula or osmeteria found on the second segment in the dorsal line in all larvæ of the subfamily *Papilioninæ* appears to be used for the same purpose, *viz.*, to frighten away enemies as are the exsertible organs present in some *Lycænidæ* larvæ on the twelfth segment as above described. In the *Papilioninæ*, however, they appear to be scent organs or osmeteria as well.

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* Since the above was written I find that Mr. Scudder writes: "These curious appendages [on the twelfth segment] were first observed by Pelzhold, and the attraction to ants of the central gland found upon the segment in front was first noted by Esper." (Butt of East. United States, p. 15.)

Whether this is the case or not with regard to the somewhat similar organs in the *Lycænidæ* is unknown to the writer. Mr. Doherty calls them "scent-glands."

The pupæ of the *Lycænidæ* are usually attached by the cremaster, (which forms the terminal portion of the pupa, and is furnished with minute hooks for attachment to the pad of silk previously spun for that purpose by the larva), and by a silken girth round the middle of the body to whatever surface the larvæ choose on which to perform their transformation. Though this is the general rule, there appear to be many exceptions. Mr. Moore, in his "Lepidoptera of Ceylon," shows the pupæ of *Spalgis epius*, Westwood, and of *Tajuria longinus*, Fabricius, freely suspended by the tail, which is the position assumed usually in the families *Lemoniidæ* and *Nymphalidæ*. This is also the position assumed by an Assamese species of *Poritia*, a pupa-skin of which Mr. W. Doherty has recently shown me.* The anal segments in this pupa are strongly curved, so that the main axis of the pupa is parallel to that of the leaf to which it is attached, and the pupa is not girt by a silken band. Mr. Trimen notes the same thing, remarking that the pupæ of some *Lycænidæ* are "attached by the tail only in a fixed horizontal or slightly inclined position." Still further, as I gather from the late Mr. William Buckler's work on "The Larvæ of the British Butterflies and Moths," certain pupæ of British Blues and Hairstreaks in confinement are quite free, and are not even suspended by the tail. Mr. Buckler notes of the pupa of "*Polyommatus*" *alsus*: "Neither suspended by the tail nor had it any silken cincture;" presumably it changed from a larva to a pupa on the surface of the ground. This would not be improbable, as Mr. Buckler's specimens remained in the larval state from the middle of one June till the beginning of the following June, the pupal state lasting some two or three weeks. If the facts are as recorded, the transformations of this species are, as Mr. Hellins remarks, "very remarkable." The larvæ of "*Polyommatus*" *adonis*, *P. ægon*, *P. agestis* (*medon*), var. *artaxerxes*, and "*Thecla*" *quercus* are said by Mr. Buckler to form a more or less weak cocoon, or to spin a few threads between the stems of their food-plants, amongst which they change to pupæ, and to be slightly attached by the tail or to be entirely free. Mr. Trimen also notes that the pupæ of some *Lycænidæ* are hidden in the ground. This is certainly true in the case of some Indian species, the larvæ of which are attended by ants, as the latter drive the larvæ into their (the ants') nests, where they turn to pupæ in the usual way, being attached to the trunk of the tree by the tail and a girdle, the ants having constructed a temporary nest around the base of the tree.

There is a very great uniformity in the shape of the pupæ of the *Lycænidæ*; they seem never to be furnished with spines or processes, though they are often densely covered with short hairs or bristles, and Mr. Trimen (South-African Butterflies, vol. i, pl. ii, figs. 2, 2*a*) figures the pupæ of a very aberrant species, *D'Urbania amakosa*, Trimen, as having its posterior end especially most densely covered with very long hairs, giving the pupa a most singular appearance. This also is the case in one Indian species of *Poritia*, a pupa case of which I have seen. The pupæ are usually very blunt and much rounded anteriorly, the thorax rounded and often humped; behind this the body is somewhat constricted, the abdomen being convex and ending in a more or less blunt point. The posterior surface is especially flattened, being strongly appressed to whatever object (usually a leaf) on which the insect performs its transformation. The pupæ are generally dull-coloured, of various shades of red or brown; some are green; and I know of none that are brilliantly coloured or furnished with golden spots as in so many of the *Nymphalinæ*. The pupa of *Curetis* is as

* This apparently unnatural position, as it seems to defy gravity, is assumed also by the pupæ of the genus *Cirrhochroa*, Doubleday, of the subfamily *Nymphalinæ*; one species, *C. cognata*, Moore, is so figured in the "Lepidoptera of Ceylon," and I possess a pupa shell of another species, *C. aoris*, Doubleday and Hewitson, from Sikkim, both of which exhibit this peculiarity very markedly. Mr. Scudder says, that, in the case of *Cirrhochroa*, and, to a certain extent *Chlorippe*, Doubleday, "the pad of silk is so tightly woven to the surface upon which it is spun, and the cremastral hooks of the chrysalis are spread over so long a surface that the chrysalis, instead of hanging freely, lies with its ventral surface in close proximity to the surface of rest." (Butt. of East. United States, p. 112.) In South Africa, Mr. Trimen says that two genera, *Jolaus*, Hübner, and *Myrina*, Fabricius, have the pupæ attached by the tail only, horizontally usually on the underside of a leaf, or to a twig.

abnormal as its larva, being pale green, almost half a hemisphere in shape, with a short projection at one end, and looks very like a lump of jelly.

Most fortunately in the imagines of the *Lycænidæ* the markings of the underside of the opposite sexes are usually the same, otherwise, owing to the very great diversity which usually obtains in the markings and coloration of the upperside in the males and females, it would be almost impossible in many cases to correctly pair the species. The females are almost always much duller-coloured on the upperside than the males, dull browns and black frequently prevailing. The general coloration of the males is usually some shade of blue or purple, but many other colours are found, red and yellow being common, green very rare, that colour being still less frequently met with on the underside. It is found in the European *Thecla rubi*, Linnæus, the "Green Hairstreak," and in the Indian *Lehera eryx*, Linnæus. Green is, I believe, never found on the upperside of females in the *Lycænidæ*. In size the *Lycænidæ* include the smallest known butterflies, some species expanding less than half an inch when the wings are wide outspread. The majority of the species are about an inch in expanse, while a few reach two inches, which may be considered to be a large size. One Indian species, *Liphyra brassolis*, Westwood, is as aberrant in size as it is in other characters, being the only known species of the family which exceeds three inches in total expanse. As a family, the *Lycænidæ* are remarkable for their often excessive abundance in individuals, in this respect outnumbering any other family; and for their extensive range over the earth's surface, as they occur in the coldest and hottest regions, and often reach the highest mountain altitudes. Their colouring is also often most brilliant, metallic shades of green and blue are found almost equalling the glories of the South-American *Morphos* on a small scale. The patterns of the undersides are often most intricate and involved, metallic spots frequently abounding. With regard to the habits of the *Lycænidæ* a very large proportion of them are found in open meadow or grass land, this being especially the case in temperate climates. A good many species in the tropics are also found in similar localities, but by far the greater number frequent trees and bushes, especially open spots or paths in forests and overhanging trees by road sides. As usual the rich forests which clothe the slopes of the Himalayas, especially to the eastwards, produce the greatest number and most beautiful species. this being especially the case at an elevation of from two to four thousand feet. The males of most of the *Lycænidæ* are particularly fond of sucking up the moisture from the damp sandy sides of hill streams, hence that sex is by far the commoner in collections; the females probably fly much less than the males and keep more to the jungles, settling on trees and bushes where they are difficult to follow and to catch. All the butterflies of this family have the habit, when first settled, of rubbing the hindwings one over the other, the motion being apparently more or less rotary. Mr. Trimen notes on the subject: "This curious habit is practised by every member of the family that I have watched when settled, and it seems not improbable—looking to the brilliant eye-like metallic spot and (very often) adjacent tail or tails at the posterior angle of the hindwing of these butterflies—that the movement may serve to accentuate these ornaments, either in rivalry or in menace." (South-African Butterflies, vol. i. p. 30, footnote.) Mr. Scudder thinks that the action may cause a stridulation, which, though inaudible to our ears, may be heard by insects. The habit of closing the wings when at rest amongst the *Lycænidæ* is by no means universal; large numbers rest with wings fully expanded or half open to show off the brilliant colouring of the upperside. The more robustly-constructed *Lycænidæ* have an extremely rapid flight, so fast indeed that the eye can hardly follow them; but these flights are not usually of long duration or for any great distance; the butterflies soon settle again. The species which live amongst the grass have usually a weak flight and are easily caught. These latter embrace what are called in England the "Blues." Of quite a different habit are the "Hair-streaks;" they have a rapid flight, and hardly ever settle on the ground, being almost always found on bushes or low trees. They seldom come to flowers, and to discover them it is often necessary to beat the trees or bushes affected by them to make them fly. The great Oriental genus *Arhopala*, Boisduval, amongst others, can only be caught in this way; even the males never seem

to go to water, nor does either sex visit flowers. The genus *Chrysophanus*, Hübner, the species of which are called "Coppers" in England, are mostly found in meadows, and have a short jerky rather quick flight. In India they occur only in the Western Himalayas.

Sexual dimorphism does not appear to obtain to any great extent in the *Lycænidæ*, though in the genus *Zephyrus*, Dalman, Mr. J. H. Leech records that one Japanese species, *Z. japonica*, Murray, has four distinct forms of females with numerous intergrades between them. In India I do not know positively of any species of *Lycænidæ* that is sexually dimorphic, though I strongly suspect that this phenomenon occurs in *Zephyrus birupa*, Moore, one form of its female having been described as a distinct species under the name of *Z. ziha*, Hewitson.

Seasonal dimorphism obtains to a very great extent, but has hitherto remained quite unrecognised in the Oriental region. Mr. W. H. Edwards in North America has worked out the subject fully with regard to *Lycæna* (*Cyaniris*) *pseudargiolus*, Boisduval and Leconte, which not only has distinct winter, spring, and summer forms, but has local races also which have developed seasonal forms of their own. In India the seasonal forms seem to be chiefly restricted to two, a wet and a dry, but in Sikkim the dry-season form which occurs at the end of the year differs somewhat from the dry-season form which occurs in the spring, so that with regard to some species there may be said to be three forms—a spring, a wet-season, and a winter form. Seasonal dimorphism, according to my own observations, occurs in India in the genera named below, but I feel sure that if collectors would devote a little time and attention to the matter, many other hitherto unexpected facts of this nature would be discovered.

Genera of Indian Lycænidæ in which seasonal dimorphism occurs.

Neopithecops.	Niphanda.	Aphnæus.
Taraka.	Everes.	Ticherra.
Megisba.	Nacaduba.	Cheritra.
Chilades.	Lampides.	Horaga.
Cyaniris.	Catochrysops.	Loxura.
Zizera.	Castalius.	Yasoda.

Mimicry amongst the *Lycænidæ* is a subject which I believe has never been broached, though doubtless it occurs to a considerable extent. Unfortunately, I have not studied the matter, and can give no facts of my own observing. Mr. W. Doherty, who is, I believe, the only one who has made any researches in the matter, has given me the following table. It must be remembered that the mimicry is shewn by the markings of the underside, the butterflies requiring protection when at rest :—

Protected genera.		*Mimicing genera.*
Neopithecops, Distant. *Pithecops*, Horsfield.	... ...	Mimicked by a *Cyaniris*, Dalman, and a *Logania* (*substrigosa*, Moore).
Eooxylides, de Nicéville. *Yasoda*, Doherty, MS. *Loxura*, Horsfield.	... ...	Mimicked by Mr. Doherty's division *Theclinæ*, as for instance *Eooxylides tharis*, Hübner, by *Neocheritra gama*, Distant.
Drupadia, Moore. *Biduanda*, Distant.	... ...	Mimicked by *Araotes*, Doherty, MS., possibly by *Poritia*, Moore, and by the *Theclinæ*.
Cyaniris, Dalman, of the group of *cælestina*, Kollar. Probably several species are more or less protected.	...	Mimicked by *Chliaria*, Moore, and some species of *Tajuria*, Moore.
Lampides ælianus, Fabricius (possibly) and *L. elpis*, Godart (probably) with its allies and representatives.	...	Mimicked by species of the genus *Arhopala*, Boisduval.

With regard to protective resemblance, which is akin to mimicry, Mr. Pryer makes the following interesting remarks :—"The upper and undersides of the wings [in the *Lycænidæ*] are utterly different, presenting a startling contrast. This is of great service to them as a protection from their numerous enemies. I have often watched a dragon-fly attempt to catch one of the Blues, but never saw a capture made ; when in flight the Blue at a distance presents only the impression to the eye, of a blue substance moving along irregularly, but if viewed closer the rapid irregular flight of the insect brings alternately into view, greyish-white and blue (or brown in the female). The dragon-fly makes a succession of dashes at his prey, which, if hard pressed, will settle with closed wings, presenting an entirely new appearance,

when the baffled pursuer almost invariably abandons the chase." ("Rhopalocera Nihonica," p. 20.)

In forming a tabular index in linear order of the species of any family of the animal or vegetable kingdoms, it must be distinctly realized that any linear arrangement must be more or less artificial, and most naturalists will admit that the relationships between species can be most truly and naturally represented in the ramifications of a genealogical tree: or that allied groups touch one another, so to speak, at several points, or show affinities on different sides and in different directions; so that, when placed in a linear series, though in contact with genera and species to which they are manifestly related, they must be separated from others which appear also to be their allies: and that in attempting to form naturally continuous sequences there must be interpolations of more or less aberrant forms which mar the perfect continuity.

In the selection of characters to serve as indices of primary or secondary importance in determining groups, no certain law or rule can be, or at any rate has yet been, adopted. Characters which serve in one order or family as of primary value are of only minor importance in another, nor can any one organ or character be arbitrarily selected of more classificatory value than another. The number and arrangement of pistils and stamens in the vegetable kingdom might naturally have seemed to Linnæus to be correlated with structural differentiations of primary value; but further botanical research has shown that this is not the case, and that a natural order seems to depend on combinations of numerous and varying characters. In the *Coleoptera* certainly it so happens that the articulations of the tarsus are so correlated with differences of habit and structure as to serve by themselves as characters of primary importance; but such pre-eminence of a single character is unusual in natural history. In studying the Indian *Lycænidæ* no single character seems to serve as a really satisfactory and constant guide for forming well-defined groups; and it must also be borne in mind that no grouping, based on a study of the *Lycænidæ* of a restricted area, can be expected to serve for the classification of the whole of this family as spread over the earth's surface; and that therefore any classification of Indian species only can be but provisional, though perhaps serving as a useful aid to future workers in a larger field.

In seeking for some one structural feature whereby to define the primary groups, if not rigidly, yet sufficiently for the purposes of the Key, the subcostal nervules of the forewing may seem to offer suitable characters. The number and position of these nervules give much assistance in determining the relationship of genera and species in some families, but, as pointed out by Mr. Hewitson ("Illustrations of Diurnal Lepidoptera"—*Lycænidæ*), these characters differ even in the sexes of the same species in some of the *Lycænidæ*. Such instances are however but rare, and if these be treated as abnormal deviations from general rules, the arrangement of these nervules can be utilized as characters of, at any rate, secondary or tertiary value in classification. Thus, if adopted as primary characters, they will be found to separate *Thecla* far from *Zephyrus*, *Euaspa*, &c.; *Yasoda* from *Loxura*; *Lycænesthes* from the tailless "blues"; *Amblypodia* from *Arhopala*, &c. If however the arrangement of these nervules fails to define the limits of primary groups they may be usefully employed as minor characters.

In discussing these nervules it seems necessary *en passant* to point out that in this work the view, advocated by Westwood and adopted in the introduction of this work (*vide* vol. i, pp. 11, and 17), as to the subcostal nervure being continued to the margin of the wing after throwing off 2, 3 or 4 nervules only towards the costa, is constantly maintained. Mr. Distant regards the terminal portion of the nervure as an additional and last nervule, and then he notes, 3, 4, and 5 nervules in the cases where only 2, 3, or 4 are specified in this work; this is of course only an apparent discrepancy; and it is really of no importance which view is maintained, so long as the student realizes the system adopted in the work which he is consulting. Mr. Moore in the "Lepidoptera of Ceylon" often treats the upper discoidal nervule (as defined

in this work, and by Westwood, Distant, and most entomologists) as a subcostal nervule ; so that his descriptions in respect to the number of these nervules are still more in (apparent) disagreement with those in the following pages.

In looking for some other feature whereby to define main groups, the filamentous appendages which often appear on the hindwing naturally suggest themselves. These "tails" however are sometimes somewhat uncertain characters, as genera occur in which obviously very closely related species differ *inter se* in the presence or absence of these delicate filamentous appendages ; in fact it would appear that the same species (*e.g.*, *Nacaduba ardates* and *Megisba malaya*). may have both tailed and tailless forms. Regarding, however, such deviations from the ordinary type as occasional and abnormal only, the presence or absence of tails, their number, form, and size, seem to serve better than any other single structural feature as characters uniting naturally allied groups ; and as such they are used as of primary importance in the following table.

Here however it should be recognized that the importance of this character, as of any other, must not be exaggerated : nor must it be assumed to be perfectly constant. The classifier is apt to become more or less a slave to his system, and to attach too strong a value to his characters : thus he is inclined to say that one species certainly strongly resembles another, but that the resemblance can only be superficial, as the first has three and the second only two subcostal nervules in the forewing ; whereas the fact perhaps may be that the manifest resemblance is real and betokens true affinity, while the structural difference in respect to the subcostal nervules may be really unimportant, having a value more or less fictitious, and dependent only on the classifier's arbitrary and artificial system.

With these reservations as to real value and constancy of the characters used in the following table, and as to the artificial nature at the best of any linear "index methodicus," it may be claimed that this Key seems to bring together insects which are naturally allied. A general consensus of collectors and students seems to recognize as real and natural groups the true tailless "blues," tailled "blues," and "hairstreaks" ; or alliances, of which *Poritia*, *Lycæna*, *Polyommatus*, *Amblypodia*, *Thecla*, *Myrina*, and *Deudorix* represent the main types. It is really immaterial with which group the series commences or ends ; nor, for reasons already given, does it seem possible to place each group so that it shall fit exactly and truly between those which precede and follow. It will be seen that at one end stands the *Gerydus* group with abnormal tibia or tarsus, and with apparent affinities to Geometers or other delicate *Heterocera* : at the other *Liphyra*, of which the stout build and other characters suggest relationship to the *Nymphalinæ* among butterflies and *Castniidæ* among moths. Between these lie the normal *Lycænidæ*, commencing with the brilliantly coloured *Poritia* group ; then follow the tailless "blues" or *Lycæna* group, with their short and round hindwings, passing into the closely allied tailed "blues" with very similar hindwings, the *Polyommatus* group ; these pass into the *Amblypodia* group, whose hindwings are normally less round, and are more produced and sometimes lobed, varying much in respect to the single tail, which is generally much stouter than in the preceding group, but is sometimes filamentous, and indeed occasionally obsolete. These blend with the Coppers and Hairstreaks, the *Thecla* group, with one or two tails and more elongated hindwings, and pass naturally into the Hairstreaks with two or three tails, the well-marked *Myrina* and *Horaga* groups. These are connected by a few genera with single tails of extraordinary length, accompanied by a distinct lobe (*Loxura* group), with the *Deudorix* group distinguished by their elongate hindwings produced anally into a long deep and distinct lobe, and furnished with one tail. Here and there stand peculiar genera which diverge from the more distinct types and seem to mar the exact order based on the selected classificatory characters, but which appear to have natural affinities with the groups in or near which they are located in the Key.

Admitting that a "natural system" must take cognizance of all or nearly all the different structural features, &c., of the several forms, it is manifest that it is in the egg stage that

the number of these characters is at a minimum ; and it is therefore probable that the egg may more readily furnish a few marked distinctive features whereon to found main groups. In this view Mr. Doherty's investigations should be of great value to Indian Lepidopterists. He recognizes (*vide supra*, p. 6) six subdivisions of Indian *Lycænidæ*, founded on the form of the egg ; and these happen to accord well with the groups herein adopted and founded on various characters in the perfect insect. His *Gerydinæ* accord with the *Gerydus* group of this work : his *Lycæninæ* with our *Lycæna* and *Polyommatus* groups ; his *Poritinæ* with our *Poritia* group ; his *Theclinæ* embrace the *Thecla* and *Myrina* groups ; and his *Deudoriginæ* and *Amblypodinæ* agree generally with the groups of the same name in the following Key.

Key to the Indian Genera of LYCÆNIDÆ.

Gerydus group.

A. Forewing with less than four subcostal nervules* ; forewing less than three inches in expanse.

a. Legs abnormal, deformed in either the tibia or the tarsus. Both sexes, forewing with three subcostal nervules.

a^1. Legs very long ; tarsi abnormal.

a^2. First joint of tarsi elongated, widened and compressed ; forewing with upper discoidal nervure originating from subcostal nervure beyond end of cell.

XCV.—GERYDUS.

b^2. First joint of tarsi elongated, but neither widened nor compressed.

a^3. Forewing with upper discoidal nervule originating from subcostal nervure beyond end of cell ; third subcostal nervule short.

XCVI.—PARAGERYDUS.

b^3. Forewing with upper discoidal nervule originating from subcostal nervure at end of cell ; third subcostal nervule long.

XCVII.—ALLOTINUS.

b^1. Legs short, tibiæ abnormal, apices of tibiæ globosely incrassated ; forewing with upper discoidal nervule originating from subcostal nervure beyond end of cell.

XCVIII.—LOGANIA.

b. Legs normal, as described typically for the family *Lycænidæ*.

Poritia group.

a^1. Forewing, first subcostal nervule anastamosed completely with costal nervure, except a very short free basal portion.

a^2. Both sexes, forewing with four subcostal nervules ; male with no secondary sexual characters.

XCIX.—ZARONA.*

b^2. Both sexes, forewing with three subcostal nervules.

a^3. Male with secondary sexual characters ; hindwing, upperside with a tuft of hair in discoidal cell, and another on abdominal margin.

C.—PORITIA.

CI.—PSEUDODIPSAS.

Lycæna group.

b^3. Male with no secondary sexual characters.

CII.—PITHECOPS.

b^1. Forewing, first subcostal nervule with its apical portion free from costal nervure as well as its basal portion, often entirely free.

a^2. Hindwing not provided with tails† or lobes, not prolonged or produced posteriorly ; outer margin rounded and entire, not dentate.

a^3. Both sexes, upperside, both wings of some shade of fuscous or brown, never blue or purple ; forewing, first subcostal nervule entirely free from costal nervure.

a^4. Both sexes, forewing with three subcostal nervules.

a^5. Both sexes, forewing, costa and outer margi strongly convex.

CIII.—NEOPITHECOPS.

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* Except the genera *Amblypodia, Iraota* and *Zesius*, which have four subcostal nervules in the forewing in the male, and three in the female ; and *Zarona* and *Dacalana*, which have four subcostal nervules in both sexes.

† Except the genus *Megisba*, which is abnormal in some species, or forms, or individuals, having a single delicate short filamentous tail.

b[5]. Male, forewing triangular, costa and outer margin nearly straight.

a[6]. Antennæ incrassate, without well-formed club, less than half the length of costa of forewing.

a[7]. Underside, both wings marked with numerous fine zigzag dark brown lines.

CIV.—SPALGIS.

b[7]. Underside, both wings marked with numerous prominent and rounded large black spots.

CV.—TARAKA.

b[6]. Antennæ with well-formed club, half or more than half the length of costa of forewing; sometimes not tailed, sometimes with a very delicate tail to hindwing.

CVI.—MEGISBA.†

b[4]. Both sexes, forewing with two subcostal nervules,

CVII —NEOLYCÆNA.

b[3]. Male, upperside, both wings more or less of some shade of blue or purple. Both sexes, forewing with three subcostal nervules.

a[4]. First subcostal nervule very near to or touching costal nervure, but not anastomosed with it.

a[5]. Hindwing with second median nervule given off before lower end of cell.

a[6]. Third subcostal nervule arising from costal nervure nearer to base of upper discoidal than to apex of wing.

CVIII.—LYCÆNA.

CIX.—CHILADES.

b[6]. Third subcostal nervule arising from costal nervure nearer to apex of wing than to base of upper discoidal.

CX.—CYANIRIS.

b[5]. Hindwing with second median nervule given off at lower end of cell.

CXI.—ZIZERA.

b[4]. First subcostal nervule anastomosed with costal nervure, except a short length at base and terminal portion which runs free to costa.

a[6]. Costa of hindwing convex, apex of wing rounded.

CXII.—AZANUS.

b[6]. Costa of hindwing slightly concave, apex of wing acute.

CXIII.—ORTHOMIELLA.

b[2]. Hindwing with three ciliated very short and fine tails, no lobe, not prolonged or produced posteriorly; outer margin rounded and entire, not dentate. Both sexes, forewing with three subcostal nervules.

CXIV.—LYCÆNESTHES.

c[2]. Hindwing not provided with tails or a lobe, outer margin entire, not dentate, anal angle of male acute. Both sexes, forewing with three subcostal nervules.

CXV.—NIPHANDA.

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† Except the genus *Megisba*, which is abnormal in some species, or forms, or individuals, having a single delicate short filamentous tail.

Polyommatus group.

d^2. Hindwing short, with a short delicate filamentous tail at end of first median nervule;* no lobe; not prolonged or produced posteriorly; outer margin rounded and entire, not dentate. Both sexes, forewing with three subcostal nervules.

- a^3. Forewing, first subcostal nervule anastomased with costal nervure soon after its origin, but again becoming free and running free to costa.
  - a^4. Hindwing, underside, base bearing black spots.
    - a^5. Both sexes, both wings, upperside black, anal half of hindwing orange.

      CXVI.—TALICADA.
    - b^5. Male, both wings, upperside blue; both sexes, hindwing, anal half concolorous with rest of wing.

      CXVII.—EVERES.
  - b^4. Hindwing, underside, base not bearing black spots, but both wings having catenulated white bands.

    CXVIII.—NACADUBA.†
- b^3. Forewing, first subcostal nervule connected with costal nervure by a short spur, otherwise free.
  - a^4. Male, forewing, upperside, basal two-thirds shining metallic steel-blue or purple, exterior one-third black.

    CXIX.—JAMIDES.
  - b^4. Male, both wings, upperside, pale azure-blue or bluish milky-white, with narrow exterior black border, one Malayan species green.

    CXX.—LAMPIDES.
- c^3. Forewing, first subcostal nervule impinging on or almost touching costal nervure.
  - a^4. Underside, both wings brown or drab, with whitish-bordered catenulated markings.

    CXXI.—CATOCHRYSOPS.
  - b^4. Underside, both wings, whitish or greyish, with black, brown, or rusty dashes and spots.

    CXXII.—TARUCUS.
  - c^4. Underside, both wings with blackish oblique basal fasciæ, blotches and spots.

    CXXIII.—CASTALIUS.
- d^3. Forewing, first subcostal nervule free from costal nervure.

  CXXIV.—POLYOMMATUS.

Amblypodia group.

e^2. Hindwing elongated and produced at anal angle, which is rather broadly lobate and tailed at end of submedian nervure. Male, forewing with four subcostal nervules, female with three.

- a^3. Both sexes, hindwing with one tail; forewing, costal nervure ending on outer margin below apex of wing.

  CXXV.—AMBLYPODIA.*
- b^3. Male, hindwing with one tail, female with two; male, forewing, costal nervure ending on outer margin below apex of wing; female ending at apex; both sexes, forewing, discoidal nervules with a common origin, middle disco-cellular nervule wanting. Male with small tuft of hairs on inner margin of forewing.

  CXXVI.—IRAOTA.*

f^2. Hindwing produced but truncated posteriorly, anal angle strongly lobate; male with one tail from third median nervule, female with additional tail from second median nervule. Both sexes, forewing with three subcostal nervules.

CXXVII.—SURENDRA.

g^2. Hindwing toothed at end of each vein in female, teeth hardly long enough to be called tails; no anal lobe; hindwing rounded. Both sexes, forewing with three subcostal nervules?

CXXVIII.—APPORASA.

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* Except the genera *Amblypodia*, *Iraota* and *Zesius*, which have four subcostal nervules in the forewing in the male, and three in the female; and *Zarona* and *Dacalana*, which have four subcostal nervules in both sexes.

† Except in the genus *Nacaduba*, in which some species or climatic or seasonal forms, or individuals are found without these tails.

k[2]. Hindwing with three short tails in female; a large anal lobe; hindwing elongated and somewhat produced posteriorly. Both sexes, forewing with three subcostal nervules?

CXXIX.—THADUKA.

i[2]. Hindwing tailless, or with one tail from first median nervule, which is either filamentous, or short and stout, or spatulate. Hindwing not so short or evenly rounded as in the *Polyommatus* group. Both sexes, forewing with three subcostal nervules.

a[3]. Hindwing, apex rounded, or but slightly produced; tail short and conical, or filamentous, or entirely absent.

CXXX.—ARHOPALA.

CXXXI.—ACESINA.

b[3]. Hindwing, apex strongly produced and hooked; tail spatulate.

CXXXII.—MAHATHALA.

j[2]. Hindwing sometimes angulate, sometimes rounded and entire; no tail; all species distinguished from all other genera (except *Drina*) by a shining silvery-white underside; also (except both sexes of *Amblypodia* and the males only of *Iraota* and *Zesius*) by having the costal nervure of forewing ending on outer margin below apex of wing. Both sexes, forewing with three subcostal nervules.

CXXXIII.—CURETIS.

Thecla group.

k[2]. Hindwing somewhat elongated, outer margin often somewhat dentate, usually furnished with a short filamentous tail from apex of first median nervule.

a[3]. Male with elongated glandular patch of scales at upper end of discoidal cell. Both sexes, forewing with two subcostal nervules; middle disco-cellular in male arising far beyond, in female at base of, upper discoidal nervule.

CXXXIV.—THECLA.

b[3]. Males with no secondary sexual characters. Both sexes, forewing with three subcostal nervules.

a[4]. Forewing, upper discoidal nervule given off from subcostal nervure long after apex of discoidal cell.

a[5]. Hindwing, second median nervule given off before apex of discoidal cell.

CXXXV.—ZEPHYRUS.

b[5]. Hindwing, second median nervule given off at apex of discoidal cell.

CXXXVI.—EUASPA.

b[4]. Forewing, upper discoidal nervule given off from subcostal nervure before or at apex of discoidal cell.

a[5]. Female furnished with a tuft of closely-set hairs at the end of the abdomen.

CXXXVII.—CHÆTOPROCTA.

b[5]. Female not furnished with a tuft of closely-set hairs at the end of the abdomen.

a[6]. Forewing, underside, basal half with numerous black spots; hindwing with a filamentous tail at end of first median nervule, tail sometimes reduced to a tooth.

CXXXVIII.—CHRYSOPHANUS.

b[6]. Forewing, underside, basal half unmarked; hindwing sometimes with an elongated tail, sometimes with only a tooth at end of first median nervule.

CXXXIX.—ILERDA.

l[2]. Hindwing in male with two short filamentous tails under half an inch in length.

a[3]. Female with three tails. Male, forewing with four subcostal nervules, female with three.

CXL.—ZESIUS.*

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* Except the genera *Amblypodia*, *Iraota*, and *Zesius*, which have four subcostal nervules in the forewing in the male, and three in the female; and *Zarona* and *Dacalana*, which have four subcostal nervules in both sexes.

*b*³. Females with two tails.

*a*⁴. Male, forewing with four subcostal nervules; secondary sexual characters as in the following genus (*Arrhenothrix*).

CXLI.—DACALANA.*

*b*⁴. Male, forewing with three subcostal nervules.

*a*⁵. Male, hindwing with glandular patch of scales near costal base.

*a*⁶. Male, forewing, upperside with tuft of hairs on middle of submedian interspace, also with tuft of hairs turned under and upwards on inner margin towards base.

CXLII.—ARRHENOTHRIX.

*b*⁶. Male, forewing, upperside with no tuft of hairs on middle of submedian interspace.

*a*⁷. Male, forewing with tuft of hairs turned under and upwards on inner margin towards base.

CXLIII.—CAMENA.

*b*⁷. Male, forewing with no tuft of hairs turned under and upwards on inner margin towards base.

CXLIV.—MANECA.

*b*⁵. Male, both wings without secondary sexual characters.

*a*⁶. Tails at apices of first and second median nervules.

CXLV.—MOTA.

*b*⁶. Tails at apices of submedian nervure and first median nervule.

*a*⁷. Forewing, middle disco-cellular nervule arising at base of upper discoidal; disco-cellular nervules of equal length.

CXLVI.—APHNÆUS.

*b*⁷. Forewing, middle disco-cellular nervule arising from upper discoidal some little distance beyond its base; middle disco-cellular nervule much shorter than lower disco-cellular.

*a*⁸. Third subcostal nervule long; tails of equal length.

CXLVII.—TAJURIA.

*b*⁸. Third subcostal nervule very short; inner tail much longer than outer tail.

CXLVIII.—SUASA.

*c*⁴. Male, forewing with two subcostal nervules.

*a*⁵. Forewing, first subcostal nervule and costal nervure well separated.

*a*⁶. Female with outer tail ciliated, longer than inner tail; longer in the female than in the male.

CXLIX.—THAMALA.

*b*⁶. Both sexes with both tails filiform, of nearly equal length in both sexes.

CL.—HYPOLYCÆNA.

*b*⁵. Forewing, first subcostal nervule strongly bowed upwards towards costal nervure and nearly touching it.

CLI.—CHLIARIA.

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* Except the genera *Amblypodia*, *Iraota*, and *Zesius*, which have four subcostal nervules in the forewing in the male, and three in the female; and *Zarona* and *Dacalana*, which have four subcostal nervules in both sexes.

Myrina group.

m^2. Hindwing, both sexes with two tails, one tail over half an inch in length.

a^3. Inner tail from end of submedian nervure the longer; male with no secondary sexual characters.

a^4. Both sexes, forewing with two subcostal nervules.

CLII.—ZELTUS.

b^4. Both sexes, forewing with three subcostal nervules.

CLIII.—CHARANA.

b^3. Outer tail from end of first median nervule the longer. Both sexes, forewing with three subcostal nervules.

a^4. Males with no secondary sexual characters.

a^5. Forewing, apex truncated, outer margin concave from apex to termination of third median nervule.

CLIV.—CHERITRELLA.

b^5. Forewing, apex acute, outer margin straight.

a^6. Outer tail very broad at base, tapering to apex; forewing, middle disco-cellular very short, one-third the length of lower disco-cellular nervule.

CLV.—NEOMYRINA.

b^6. Outer tail of equal breadth throughout, not very broad at base; forewing, middle disco-cellular almost as long as lower disco-cellular nervule.

CLVI.—TICHERRA.

b^4. Male, hindwing with a small tuft of hairs at base of costal interspace.

CLVII.—CHERITRA.

Horaga group.

n^2. Hindwing, both sexes with three tails.

a^3. Middle tail short, under quarter of an inch in length, all tails filiform, not ciliated. Both sexes, forewing with two subcostal nervules.

a^4. Forewing, costa strongly arched, costal nervure and subcostal nervules all well-separated from each other.

CLVIII.—RATHINDA.

b^4. Forewing, costa nearly straight, costal nervure and subcostal nervules lying close together.

a^5. Hindwing, lower disco-cellular nervule outwardly oblique; male, forewing, underside usually with glandular patch of scales on either side of submedian nervule near base of wing.

CLIX.—HORAGA.

b^5. Hindwing, lower disco-cellular nervule upright; male with no secondary sexual characters.

CLX.—CATAPŒCILMA.

b^3. Middle tail longer, over quarter of an inch in length, all tails strongly ciliated; male with secondary sexual characters.

a^4. Male, hindwing with glandular patch of modified scales on either side of base of first subcostal nervule; both sexes, forewing with three subcostal nervules.

CLXI.—BIDUANDA.

b^4. Both sexes, forewing with two subcostal nervules.

a^5. Male, forewing with glandular patch of scales on either side of submedian nervure near base of wing, below which inner margin of wing is outwardly bowed; no sexual patch on disc.

CLXII.—DRUPADIA.

b^5. Male, forewing with glandular patch of scales on middle of disc, inner margin of wing straight; no patch on submedian nervure.

CLXIII.—EOOXYLIDES.

Loxura group.

o^2. Hindwing with one very long tail; hindwing greatly elongated posteriorly and lobate at anal angle; male with no "sex-mark" below costa of hindwing.

a^3. Anal lobe blended with tail; male with no secondary sexual characters; both sexes, forewing with three subcostal nervules.

CLXIV.—LOXURA.

b^3. Anal lobe distinct from tail; male, hindwing with elongated glandular patch of scales on first median nervule; both sexes, forewing with two subcostal nervules.

CLXV.—YASODA.

Deudorix group.

p^2. Hindwing elongated and produced posteriorly, with a well-formed anal lobe (except in *Drina*), the single tail variable in length. Both sexes, forewing with three subcostal nervules.

a^3. Males with no secondary sexual characters.

a^4. Anal lobe small; tail in male not filamentous, rather broad, about a quarter of an inch in length; ground-colour of underside shining silvery-white as in *Curetis*.

CLXVI.—DRINA.

b^4. Anal lobe large; tail in male filamentous, in female much longer and highly ciliated; female, upperside, both wings fuscous, hindwing with a large white patch towards anal angle.

a^5. Of large size; underside, ground-colour green or clear ochreous; forewing, first subcostal nervule free from costal nervure.

CLXVII.—LEHERA.

b^5. Of small size; underside, ground-colour ferruginous and white; forewing, first subcostal nervule touching costal nervure.

CLXVIII.—ARAOTES.

c^4. Anal lobe large; tail in both sexes short and filamentous; female, upperside, hindwing with no large white patch towards anal angle.

a^5. Upperside, male red, female fuliginous.

CLXIX.—DEUDORIX.

b^5. Upperside, both sexes purple.

CLXX.—ZINASPA.

b^3. Males with secondary sexual characters. Hindwing with "sex-mark" below costa.

a^4. Male, forewing, no tuft of hairs on inner margin near base; hindwing, glandular "scale" patch terminating at base of first subcostal nervule; tail short and filamentous.

CLXXI.—HYSUDRA.

b^4. Male, forewing, tuft of hairs on inner margin near base, turned under and upwards.

a^5. Male, hindwing, glandular "scale" patch very variable in size, extending a short distance along basal portion of first subcostal nervule, but not reaching into interspace below; tail short and filamentous.

CLXXII.—RAPALA.

b^5. Male, hindwing, glandular "scale" patch extending across base of subcostal interspace, but not into discoidal cell; tail very long and highly ciliated.

CLXXIII.—BINDAHARA.

c^5. Male, hindwing, glandular "scale" patch extending slightly into discoidal cell, tail short and filamentous.

a^6. Of large size; forewing, middle disco-cellular nervule originating at base of upper discoidal.

CLXXIV.—VIRACHOLA.

b^6. Of small size; forewing, middle disco-cellular nervule originating a little beyond base of upper discoidal nervule.

CLXXV.—SINTHUSA.

Liphyra group.

B. Both sexes, forewing with four subcostal nervules; forewing more than three inches in expanse.

CLXXVI.—LIPHYRA.

The first division which I make in the Indian *Lycænidæ* I have called the *Gerydus* group, and is the same as Mr. Doherty's subfamily *Gerydinæ*, but with the addition of the genus *Logania*, Distant. Mr. Doherty states that the *Gerydinæ* are distinguished in all the species he has examined "by the extraordinarily flattened egg," which is "less than one-third as high as wide, delicately and sometimes obsolescently reticulate, sometimes carinate, flat above and below." The group is also distinguished "by the curious structure of the prehensores, the clasps [bifid uncus] being very long, broad, thin and plate-like, somewhat resembling the 'valves' of the *Papilionidæ*."* But the chief peculiarity of the group appears to me to be the very long legs, which in the first of these three genera Professor Westwood described as being "slender, scaly, compressed; the tarsi of all the feet with the basal joint remarkably elongated, widened, and quite compressed; the tarsus in the forelegs of the male being exarticulate, and as long as the femur and tibia united: second, third, and fourth joints in the four hindlegs very short, terminal joint small, subovate, notched at its obliquely truncated extremity, with extremely minute ungues."† In *Allotinus* and *Paragerydus* the legs are still very long, but the first joint of the tarsus instead of being flattened is rounded. The elongation of the tarsus necessarily renders the legs as a whole very long; they are indeed longer in *Gerydus*, *Allotinus* and *Paragerydus* than in any other group of the *Lycænidæ* known to me. It is probable that this group includes the genus *Miletus* of Hübner, of which the *Papilio polycletus* of Linnæus from Amboina is the type. As I have not seen this species, I cannot say with certainty whether or not it is of this group; but Mr. Kirby in his "Synonymic Catalogue," p. 378, places it in the genus *Hypochrysops* of Felder, which includes very different insects, that are apparently more nearly allied to species of the genus *Poritia*, Moore, than to the butterflies of this group. The male of *Miletus polycletus*, as figured by Cramer, is rich blue on the upperside, quite different from the dull brown and white butterflies included in the three following genera of this work. These genera, which alone possess the greatly elongated legs, have their head-quarters probably in the true Malayan region, and may certainly be said to be confined to the Indo-Malayan region. In India they are found in the North-East Himalayas only, extending southwards into Burma. The males have no secondary sexual characters.

Genus 95.—GERYDUS, Boisduval (Plate XXVI).

Gerydus, Boisduval, Sp. Gén., vol. i, pl. xxiii, fig. 2, *Gerydus symethus*, Cramer, *female imago; 2a, tarsus of foreleg of female; 2b, ditto of male* (1836); id., Distant, Rhop. Malay., p. 205, with woodcut of *posterior leg of Gerydus symethus* (1884); *Symetha*, Horsfield, Cat. Lep. E. I. C., p. 59, pl. ii, fig. 2, *imago* of *Symetha pandu, male; 2a, female; 2b—i, structure of imago* (1828); *Miletus*, Westwood (part, *nec* Hübner), Gen. Diurn. Lep., vol. ii, p. 502 (1852).

"Forewing, elongate and ovate, *costal margin* arched and convex, *apex* subacute, *outer margin* obliquely convex, *inner* margin nearly straight, very slightly concave; *subcostal nervure* with four nervules, *first subcostal nervule* emitted about one-fourth before the end of the cell, *second* near the end of the cell, *third* a little beyond the cell, *fourth* minute, starting from the third a little before the apex. Hindwing, elongate and ovate, *costal margin* nearly straight, *posterior* margin convexly rounded, distinctly angulated in the female. *Eyes* naked; *palpi* very long, terminal joint long and slender; *legs* scaly and compressed, the first joint of the tarsi remarkably elongated, widened and compressed; *antennæ* slender, terminating in a slightly-formed club."

"This is a truly remarkable genus, the enlarged and widened basal joint of the tarsi being a phenomenal character in Rhopalocera. The focus of the distribution of *Gerydus* appears to be in the true Malayan region." (*Distant*, l. c.)

In the forewing the inner angle is sometimes much produced and hook-like, the costal nervure extends to a little beyond the end of the discoidal cell, the first subcostal nervule is given

* Doherty, Journn. A. S. B., vol. lv, pt. 2, pp. 110, 132 (1886).
† Genus *Miletus*, Westwood, Gen. Diurn. Lep., vol. ii, p. 502 (1852).

off from the costal nervure long before the end of the cell, the second just before its end, the third is given off rather nearer to the apex of the wing than of the cell, rather long; the costal nervure terminates at the apex of the wing; the upper discoidal nervule is given off from the subcostal nervure far beyond the apex of the cell, a feature which occurs in six other Indian genera only; the disco-cellular nervules are of about equal length and slightly concave; the second median nervule is given off from the median nervure some distance before the end of the cell. In the hindwing the disco-cellular nervules are of equal length, the upper is straight, the lower is slightly concave, the second median nervule given off just before the end of the cell.

This genus is certainly quite unique from the peculiar structure of the legs. The prehensores of the males are as curiously formed as are the tarsi of the legs: the claspers are very long, thin, and plate-like, somewhat similar to those organs in some of the *Pierinæ* and *Papilioninæ*, and with a tuft of hairs projecting from between them anteriorly below. Five species of *Gerydus* are found within Indian limits. The coloration of the upper side is black or dark brown, with a white or pale ochreous discal band, the underside with numerous chains of pale brown spots on an ochreous-brown ground. The males have no secondary sexual characters. I am unable to give the distribution of the genus exactly, but it is probably confined to the Oriental region; nor the number of species it contains, as some species which have their legs similar to those of *Allotinus* and *Paragerydus* have been hitherto placed in *Gerydus*. *G. melanion*, Felder, from the Philippines, of which I possess specimens sent me by Herr Georg Semper, is very near to, but distinct from, *G. boisduvali*, Moore. One species, *G. chinensis*, Felder, has been described from Hongkong, China.

Key to the Indian species of Gerydus.

A. Both sexes, upperside, forewing with a discal white band.
- *a.* Male, upperside with the base of the forewing bluish-grey, the discal white fascia broad; female with the white fascia occupying more than half the wing.
  - 617. G. SYMETHUS, Burma, Malacca, Nias Island, Sumatra, Java, Sumba, Sumbawa, Flores, Amboina, Papua.
- *b.* Male, upperside with the base of the forewing fuscous.
  - *a*[1]. Of large size, discal band of forewing strongly recurved to inner margin.
    - 618. G. ANCON, Burma.
  - *b*[1]. Of smaller size, discal band of forewing smaller, not reaching inner margin.
    - 619. G. BIGGSII, Burma, Malacca.

B. Both sexes, upperside, forewing with a pale ochreous streak beyond the end of the cell, with two similar spots below it, divided by the first median nervule.
- *a.* Both sexes, underside, markings pale brown.
  - 620. G. BOISDUVALI, Sikkim, Chittagong Hill Tracts, Mergui, Tenasserim Valley, Java.
- *b.* Both sexes, underside, markings very dark umber brown.
  - 621. G. CROTON, Burma.

617. Gerydus symethus, Cramer.

Papilio symethus, Cramer, Pap. Ex., vol. ii, pl. cxlix, figs. B, C, *female* (1777); id., Stoll, Suppl. Cramer, pl. xxxvii, figs. 3, 3c, *female* (1790); id., Fabricius, Sp. Ins., vol. ii, p. 119, n. 528 (1781); idem, id., Mant. Ins., vol. ii, p. 69, n. 656 (1787); *Hesperia symethus*, id., Ent. Syst., vol. iii, pt. i, p. 280, n. 76 (1793); *Polyommatus symethus*, Godart, Enc. Méth., vol. ix, p. 675, n. 180 (1823); *Gerydus symethus*, Boisduval, Sp. Gén., vol. i, pl. xxiii, fig. 2, *female*; 2a, *tarsus of foreleg of female*; 2b, *ditto of male* (1836); id., Butler, Cat. Fab. Lep. B. M., p. 160, n. 1 (1869); idem, id., Trans. Linn. Soc. Lond., Zoology, second series, vol. i., p. 546, n. 3 (1877); id., Distant, Rhop. Malay., p. 205, n. i, pl. xx, fig. 2, *male*; pl. xxii, fig. 14, *female* (1884); *Miletus symethus*, Snellen, Tijd. voor Ent., vol. xix, p. 152, n. 37 (1876); *Symetha pandu*, Horsfield, Cat. Lep. E. I. C., pl. ii, figs. 2, *male*; 2a, *female*; 2b—1, *structure* of *imago* (1828).

HABITAT: Moulmein, Penang (*Butler*); Sumba, Sumbawa, Flores (*Doherty*); Amboina, Papua (*Westwood*); Malacca; Nias Island; Sumatra; Java.

EXPANSE: ♂, ♀, 1·3 to 1·7 inches.

DESCRIPTION: "Male. UPPERSIDE, *forewing* greyish-white, the base and basal half of the costal area bluish-grey; about the apical half of the wing black, with its inner margin

oblique and profoundly sinuate, and the apical third of the inner margin of the same colour. *Hindwing* bluish-grey, the costal area blackish, a pale discal streak extending through and beyond the cell. *Cilia* pale greyish. UNDERSIDE, *both wings* pale brownish. *Forewing* with an oblique medial whitish fascia, before and beyond which the colour is dark bluish-grey, and with the following spots and fasciæ margined with grey:—two spots in the cell, a disco-cellular elongated spot at the apex of the cell, a spot between the first and second subcostal nervules, and another between the second and third, a waved fascia extending from the fourth subcostal nervule to about the third median nervule, and a submarginal row of small dark spots placed between the nervules. *Hindwing* with the following spots and fasciæ:—three beneath the costal nervure, three crossing the cell (the third at the apex), two beneath the cell (the second bifid), beyond these a waved transverse fascia crossing the wing, and a waved submarginal dark line. *Body* and *legs* more or less concolorous with the wings. FEMALE. Resembling the male, but with the hindwing more elongated and angulated. UPPERSIDE, *forewing* with the white area much larger. *Hindwing* with the white discal streak also larger and more distinct."

"Although the male specimens collected in Malacca show no variation, such uniformity in the species does not ensue when a larger series from the whole area of its distribution is examined. As I have noticed in the British Museum and other private collections, the variability is in the extent and distinctness of the white area to the forewing. It has been erroneously stated that this species inhabits ants' nests, but no real facts can be adduced in support of the assertion." (*Distant*, l. c.)

With reference to the last remark, it may be that ants carry the full-grown larvæ into their nests to perform their transformations as in the case of *Tarucus theophrastus*, Fabricius, and other species, but that the imagines inhabit the nests altogether, as has been stated, is almost certainly incorrect. I have only seen one female specimen of *G. symethus* kindly sent me by Mr. W. Davison from Lancowie Island, eighty miles from Penang, where it was taken in March, and Moulmein is its only recorded Indian habitat.

618. Gerydus ancon, Doherty.

G. ancon, Doherty, Journ. A. S. B., vol. lviii, pt. 2, p. (1889).

HABITAT: Tenasserim valley, Tavoy district, Burma.

EXPANSE: ♂, 2·05; ♀, 1·85 inches.

DESCRIPTION: MALE. UPPERSIDE, *forewing* with the apex and outer margin black, the base dull fuscous, leaving about two-fifths of the area of the wing pure white; a white band extends obliquely from the costa one-fourth from the base, widening to the second median nervule two-thirds from the base, where it touches another white area extending from the second median nervule to the inner margin, of which it occupies the middle two-thirds, filling likewise nearly two-thirds of the interno-median interspace, and extending, except at its excised lower angle, within one-eighth of the outer margin, leaving the basal third of the interno-median interspace fuscous, and almost enclosing, with the upper band, an elongated black area occupying the basal part of the first median interspace, and united with the fuscous basal area. The third median nervule is swollen where it crosses the white band, from just beyond its origin one-fourth to its termination. *Hindwing* dull fuscous, unmarked. UNDERSIDE, *both wings* light rufous-brown, a series of obscure dark submarginal dots. *Forewing* with the white areas of the upperside reduced in size and set in a wide blackish area, a marginal dark line. *Hindwing* with obscure mottlings of slightly different shades of pale brown; three of these between the costal and subcostal nervures are bordered by transverse blackish lines, and an irregular blackish fascia extends obliquely across the disc from the submedian interspace to the discoidal nervule. FEMALE. UPPERSIDE, *forewing* lacks of course the swelling of the third median nervule; the lower white area much smaller than in the male, being narrow and oblique, occupying only one-third of the hind margin, bent inwardly above the submedian nervure, its terminal quadrate portion (between the second median

nervule and the middle of the interno-median interspace) being dehiscent outwardly along the line of the first median nervule. *Hindwing* slightly angled in the middle. UNDERSIDE, *both wings* paler, less reddish and more variegated than in the male, and the markings very irregular.

Two males and a female from the Tenasserim valley, Tavoy district, were obtained by Mr. Doherty, the type pair of which I have examined. The species appears to be a very distinct one.

619. **Gerydus biggsii,** Distant.

G. biggsii, Distant, Rhop. Malay., p. 206, n. 2, pl. xxii, fig. 12, *female* (1884).

HABITAT: Burma, Malacca.

EXPANSE: ♀, 1·1 to 1·4 inches.

DESCRIPTION: "FEMALE. UPPERSIDE, *forewing* brown, about crossed near the middle by an oblique white fascia, beyond which the brown colour is much darker and almost black. *Hindwing* uniform brown, with the *cilia* paler. UNDERSIDE, *both wings* pale brownish, with spots and fasciæ margined with grey, arranged similarly to those of *G. symethus*, Cramer. *Forewing* with the white fascia as above. MALE, resembling the female. UPPERSIDE, *forewing* with the white fascia a little narrower. *Hindwing* more convex and less outwardly angulated." (*Distant*, l.c.)

I have received a single female of this species from Lieutenant E. Y. Watson, collected by him at Beeling, Upper Burma, in May. Mr. Doherty obtained it in the Tenasserim valley.

Another species, probably of this genus, has been described as below from Siam.*

620. **Gerydus boisduvali,** Moore. (PLATE XXVI, FIG. 155 ♂).

Miletus boisduvali, Moore, Horsfield and Moore, Cat. Lep. Mus. E. I. C., p. 19, n. 2, pl. 1*a*, fig. 1, *female* (1857); id., Moore, Proc. Zool. Soc., Lond., 1865, p. 777; *Miletus boisduvalii*, Snellen, Tijd. voor Ent., vol. xix, p. 152, n. 38 (1876); id., Elwes, Trans. Ent. Soc. Lond., 1888, p. 374, n. 235.

HABITAT: Sikkim; Chittagong Hill Tracts; Mergui; Tenasserim Valley; Java.

EXPANSE: 1·33 to 1·60 inches.

DESCRIPTION: FEMALE. "UPPERSIDE, *both wings* brown. *Forewing* with a whitish fascia running from near the middle of the anterior margin to near the anal angle. *Hindwing* slightly angulated. UNDERSIDE, *both wings* pale brown. *Forewing* with the fascia as on the upperside intersected by the veins, and with three spots in the discoidal cell, one on each of the three anterior subcostal nervules; also an undulated spot near the anterior angle, and a small blackish dot between each nervule near the exterior margin. *Hindwing* also marked with undulated spots and stripes, and with a dot between each nervule. Form of wings as in *M.* [=*Gerydus*] *symethus*, Cramer, female." (*Moore*, l. c.) MALE. Differs from the female in having the pale markings of the UPPERSIDE of the *forewing* smaller, though these are very variable, being sometimes almost as large as in the female, at others almost obsolete; the wing is also longer, the apex acuminate, and the outer margin less convex; the hindwing rounded, not angulated, at the terminiation of the third median nervule. In addition to the markings described by Mr. Moore, there is a submarginal catenulated band on the underside of the forewing, and an oblique blackish straight macular band from the middle of the abdominal margin of the hindwing to the middle of the disc in some specimens of both sexes. It occurs rather commonly in Sikkim at low elevations in March, April, May, July, August, and October. Dr. Anderson took it in Mergui in March.

The figure shows both sides of a male specimen from Sikkim in my collection.

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* *Gerydus (Miletus) irroratus*, Druce, Proc. Zool. Soc. Lond., 1874, p. 106. HABITAT: Nahconchaisee, Siam. EXPANSE: Not given. DESCRIPTION: "UPPERSIDE, *both wings* dark glossy brown, with a whitish spot at the end of the cell of *forewing*. UNDERSIDE, *both wings* very like *M. melanion*, Felder [from Luzon, one of the Phillippine Isles], but differs from it in having the light markings less clearly defined, and the white lines more indistinct." (*Druce*, l.c.)

G. melanion has two spots on the upperside of the forewing in the male, one covering the base of the third median nervule, the other in the submedian interspace towards the anal angle. As *G. irroratus* is said to have only one spot, it may perhaps be recognised, but the description of it is most inadequate.

621. Gerydus croton, Doherty.

G. croton, Doherty, Journ. A. S. B., vol. lviii, pt. 2, p. (1889).

HABITAT: Tenasserim Valley, Tavoy District, Burma.

EXPANSE: ♂, 1·80; ♀, 1·75 inches.

DESCRIPTION: "MALE. UPPERSIDE, *both wings* dark brown. *Forewing* with the apical part black, an obscure fuliginous-whitish [pale ochreous] band extending obliquely from beyond the end of the cell to the second median nervule two-thirds from its origin, two obscure whitish spots beyond and below it, one on each side of the first median nervule, the lower spot sometimes obsolete. UNDERSIDE, *both wings* very dark, variegated with many shades of brown. *Forewing* with the band of the upperside dull ochreous, broad and well-marked, the upper of the two spots large and but slightly separated from the band, and the lower one very small, oblique and distinct; there are some costal markings, a subapical cordate spot, and three submarginal blackish dots. *Hindwing* has the basal half very dark, with some paler brown tranverse markings edged with dark, a blackish semi-circular band, with a slight bluish gloss, extending across the wing beyond the cell, after which comes a semi-circle of joined cordate reddish-brown maculæ, beyond which the ground is again dark, with a light brown marginal band near the apex. FEMALE. UPPERSIDE, *forewing* with the band more distinct and nearly white, extending obliquely almost to the costa and to the second median nervule two-thirds from its origin, the upper of the two spots separated from it only by the vein, the lower spot smaller and more isolated. UNDERSIDE, *both wings* much lighter and more variegated than in the male. *Forewing* with the dark submarginal dots forming a complete series. *Hindwing* with the outer part pale brown, except a large sordid area developed round the third median nervule as centre."

"The inner angle of the forewing is in this species somewhat less produced inferiorly than in *G. ancon*, Doherty. The hindwing of the female is somewhat more angled in the middle. In the male the third median nervule of the forewing is not swollen. The prehensores differ but slightly in the two species." (*Doherty*, l. c)

Mr. Doherty obtained two males and a female of this species in the Tenasserim Valley. He notes that, like *G. ancon*, it "has a strong irregular flight (quite different from the feeble, uncertain motions of the *Paragerydi* and *Loganias*), wheeling many times round the same circle or up and down a certain length of the path, and would be difficult to catch but for its habit of returning again and again to the same leaf."

Another very distinct species of this genus occurs in the Malay Peninsula, and is described below.* The male has a broad pure white discal band on the upperside of the forewing, all the markings of the underside very clearly defined. The female is unknown.

Genus 96.—Paragerydus, Distant. (PLATE XXVI.)

Paragerydus, Distant, Rhop. Malay., p. 207, woodcut n. 60, posterior leg of *Paragerydus horsfieldi*, (1884); p. 451 (1886).

"Closely allied to *Gerydus*, Boisduval, but differing by having the first joint of the tarsi greatly elongated, but not widened and compressed as in *Gerydus;* the female also differs from the male in having the outer margin of the hindwing dentately sinuate." *Eyes* naked.

"The position of *Paragerydus* is readily defined as allied to *Gerydus* and *Logania*, Distant,

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* *Gerydus gopara*, n. sp. HABITAT: Perak, Malay Peninsula. EXPANSE: *Male*, 1·55 inches. DESCRIPTION: MALE. UPPERSIDE, *both wings* dark brown. *Forewing* with the apical half still darker brown; the disc crossed by a very regular broad pure white band, commencing at the subcostal nervure, ending in the middle of the submedian interspace, its inner edge short and straight, its outer edge about twice as long and convex. *Hindwing* unmarked. UNDERSIDE, *both wings* pale purplish-brown. *Forewing* with the discal band as above, but much less prominent, its edges irregular, marked with a prominent spot at its lower outer angle; two spots across the middle of the cell, the outer the larger, another closing the cell, three spots on the costa, a subapical catenulated band of five spots—all these spots a little darker than the ground-colour, outwardly defined by a very fine grey line; a regular marginal series of short blackish lines between the veins. *Hindwing* crossed by several catenulated bands, and the marginal linear spots as in the forewing.

This species appears to be very distinct, and has no very near ally. It differs from *G. symethus*, Cramer, and *G. biggsii*, Distant, in having all the markings clear and well-defined on the underside even more distinct than in *G. boisduvali*, Moore, instead of much blurred and indistinct as in the two former species. In the well-defined regular pure white band of the forewing on the upperside it differs from all.

by having the third subcostal nervule of the forewing emitted beyond the end of the cell, and it differs from the first by the non-compressed and non-dilated tarsi, and from the second by the non-globosely incrassated tibial apices." (*Distant*, l. c., p. 207.)

In the forewing of the type species the first subcostal nervule is given off much in the same position as in *Gerydus*; the second subcostal in the male is given off at, instead of a little before, the end of the cell, in the female it is given off some little distance before the end, and the third subcostal is much shorter, and originates much nearer to the apex of the wing than it does in *Gerydus*; the upper discoidal nervule originates from the subcostal nervure after the apex of the cell in the same extraordinary way as it does in *Gerydus*, but its origin is a little nearer to the cell. Other characters of neuration much as in *Gerydus*. The prehensores of the male are formed as in *Gerydus*, and that sex has no secondary sexual characters.

The genus contains but three known species at present, which occur in Burma, the Malay Peninsula, Sumatra, Java, and Borneo. They are plain brown insects above, paler in the middle of the forewing in one species; underside white or greyish, thickly sprinkled with minute and larger-sized brown or ochreous dots and spots. *P. fabius*, Distant, from Northern Borneo differs from the other known species in having the upperside of the hindwing in the female "with the posterior margin from anal angle to near lower subcostal nervule broadly greyish-white." *

Key to the Indian species of Paragerydus.

A. Male, upperside, forewing with a prominent pale oval patch on middle of disc; underside, forewing with apex concolorous with rest of wing.

622. P. HORSFIELDI, Arakan, Chittagong Hill Tracts, Burma, Malay Peninsula, Nias Island, Sumatra, Java, Borneo.

B. Male, upperside, forewing with no prominent pale oval patch on middle of disc; underside, forewing with apex tinged with rufous-brown.

623. P. TARAS, Chittagong Hill Tracts, Tenasserim Valley.

622. Paragerydus horsfieldi, Moore. (PLATE XXVI, FIG. 156 ♂).

Miletus horsfieldi, Moore, Horsfield and Moore, Cat. Lep. Mus. E. I. C., vol. i, p. 19, n. 3, pl. 1*a*, fig. 2, *male* (1857); id., Druce, Proc. Zool. Soc. Lond., 1873, p. 347, n. 1; id., Staudinger, Ex. Schmett., p. 269, pl. xciv, *male* (1888); *Gerydus horsfieldi*, Butler, Trans. Linn. Soc., Zoology, second series, vol. 1, p. 546, n. 1 (1877); *Paragerydus horsfieldi*, Distant, Rhop. Malay., p. 207, n. 1, pl. xx, fig. 7, *female* (1884); id., Doherty, Journ. A. S. B., vol. lv, pt. 2, p. 131 (1886); *Allotinus aphocha*, Kheil, Rhop. Ins. Nias, p. 28, n. 79, pl. v, fig. 30, *female* (1884).

HABITAT: Arakan; Chittagong Hill Tracts; Burma; Malay Peninsula; Nias Island; Sumatra; Java; Borneo.

EXPANSE: ♂, 1·20 to 1·80; ♀, 1·10 to 1·60 inches.

DESCRIPTION: "MALE. UPPERSIDE, *both wings* brown. *Forewing* with an oval longitudinal whitish spot in the middle. *Hindwing* rounded and slightly angulated. UNDERSIDE, *both wings* creamy-white, densely covered with undulating brown strigæ, with a darker brown dot between each vein near the exterior margin. FEMALE. UPPERSIDE, *both wings* brown. *Forewing* with but a faint indication of lighter colour in the middle. *Hindwing* acute. UNDERSIDE, *both wings* as in the male." (*Moore*, l. c.)

"*Paragerydus horsfieldi*, and another allied species [*P. taras*, Doherty] entirely black above, occur abundantly in Arakan and the Chittagong Hill Tracts, north of which they have not yet been observed. The egg is not quite so flat as in *Allotinus multistrigatus*, de Nicéville, and there is no trace of carination: it is beautifully reticulate above." (*Doherty*, l. c.)

I possess numerous specimens taken in Rangoon from May to August and again in December, one pair taken at Bhamo in Upper Burma in August; there are two females from the Chittagong Hill Tracts taken by the late Mr. H. M. Parish in November, also one from Perak, in the Indian Museum, Calcutta; and Mr. Distant records it from Penang, Sunjei Ujong, Malacca, and Singapore. It is evident from the dimensions given above that this species varies

* Ann. and Mag. of Nat. Hist., fifth series, vol. xix, p. 266, n. 104 (1887).

much in size. I append Mr. Distant's description of it.* Mr. Elwes (Trans. Ent. Soc. Lond., 1888, p. 374, n. 236) records this species from Sikkim with doubt. I do not think it occurs north of Chittagong. Mr. Doherty writes : "This species is the commonest of the *Gerydinæ* from the Chittagong Hill Tracts to South-Eastern Borneo, found in great numbers wherever there is deep shade. I am inclined to think that this species (and not *P. taras*, mihi, with its conspicuous reddish apex and margin) is the *Allotinus unicolor* of Felder, but without examining the types of that species it is imposible to decide."

"The cell in this species ends half-way between the bases of the second and third subcostal nervules. On this character the genus *Paragerydus* has been formed, but it is improbable that it can be retained distinct from *Allotinus*. *P. taras* seems to be structurally half-way between the two."

The figure shows both sides of a male example from Bhamo, Upper Burma, in my collection.

623. **Paragerydus taras**, Doherty.

P. taras, Doherty, Journ. A. S. B., vol. lviii, pt. 2, p. (1889).

HABITAT : Tenasserim Valley, Burma ; Chittagong Hill Tracts.

EXPANSE : ♂ ♀, 1·5 to 1·6 inches.

DESCRIPTION : "MALE. UPPERSIDE, *both wings* dark brown. *Forewing* dark brown, deepest apically, lacking the elongate discal brand of *P. horsfieldi*, Moore. UNDERSIDE, *both wings* creamy-white (dull bluish-grey in *P. horsfieldi*), the striæ less numerous, especially discally and basally, and less evenly distributed ; the transverse macular discal band is nearly as obvious as in *P. horsfieldi*, but is composed of slender, crescent-shaped markings, beyond which is a submarginal line of blackish dots. *Cilia* rather long, rufous-brown. *Forewing* with the apex widely tinged with rufous-brown, the subapical blackish dots situated in the brown area touched outwardly with white. *Hindwing* with a rufous-brown marginal line. FEMALE. UPPERSIDE, *forewing* lacking the pale discal area of the female of *P. horsfieldi* ; otherwise marked as in the male."

"In the male the forewing is longer and more acute than in *P. horsfieldi*, its outer margin but little curved, while in the female its upper portion is strongly convex. In the hindwing the degree of marginal undulation varies greatly, as is also the case with *P. horsfieldi*. The female is paler than the male, and while flying has almost the air of a white butterfly."

"The prehensores obviously differ from those of *P. horsfieldi*, the tip of the unci (*legumina*) being rounded and obliquely truncate, while in *P. horsfieldi* they are very oblique and regularly tapering. As seen from the side, the clasps (*harpagones*) end in two processes separated by the deep sinus, the upper longest, and ending in a strong hook directed upwards. In *P. horsfieldi* the upper process is obsolescent, represented only by an angle in the upper contour of the other." (*Doherty*, l. c.)

The types are from the Tenasserim Valley, east of Tavoy, Burma, it occurs also in the Chittagong Hill Tracts. Mr. Doherty notes that "an apparently identical form occurs in the Malay Peninsula and South-Eastern Borneo, but I have no specimens now available for comparison."

Genus 97.—ALLOTINUS, Felder. (PLATE XXVI).

Allotinus, Felder, Reise Novara, Lep., vol. ii, p. 285 (1865) ; id., Distant, Rhop. Malay., p. 208 (1884) ; p. 451 (1886) ; id., Butler, Ent. Month. Mag., vol. xxii, p. 59 (1885).

"*Antennæ* gradually thickened, a little longer than in *Miletus*. *Palpi* with the third joint acicular [needle-shaped], rather long, especially in the female. *Forewing*, with the *subcostal nervure* three-branched [excluding terminal portion of subcostal nervure], the third branch rather long, emitted beyond the cell, the *upper discoidal* nervule starting from the

* "MALE. UPPERSIDE, *both wings* dark brownish. *Forewing* with a pale ochraceous streak beyond the cell, extending along the third median nervule for about half its length. UNDERSIDE, *both wings* greyish, thickly mottled with irregularly-shaped and sized brown markings. *Cilia* pale brownish. *Body* and *legs* more or less concolorous with the wings. FEMALE. Resembling the male, but with the *forewing* proportionally shorter, and its outer margin convex. *Hindwing* with the outer margin dentately sinuate. UPPERSIDE, *forewing* with the pale streak [of the male] almost obsolete." (*Distant*, l. c.)

inclosure [*clausu*] of the cell, the *upper disco-cellular* nervule distinct. *Legs* rather long, slender, acicular, the hinder tibiæ nearly equal to the femora." *Eyes* naked.

"Very distinct from *Miletus*, Westwood, on account of the structure of its tarsi." (*Felder*, l. c.)

In the forewing the costal nervure terminates about opposite to the apex of the discoidal cell; the first subcostal nervule is given off long before, the second a little before the apex of the cell, the third subcostal is long and is emitted about midway between the apex of the cell and of the wing; the upper discoidal nervule emitted exactly at the apex of the cell; the other neural characters much as in *Gerydus*, Boisduval, and the prehensores of the male similar: that sex also has no secondary sexual characters.

Allotinus differs from *Gerydus* in having the tarsi rounded, not widened and compressed, and in the position of the upper discoidal nervule of the forewing, in this latter character it differs also from *Paragerydus*. It differs from *Paragerydus* in having the third subcostal nervule of the forewing long, and emitted at one-half between the apex of the discoidal cell and the apex of the wing, while in *Paragerydus* it is short, and is emitted at one-third before the apex of the wing only. *Allotinus* agrees with *Paragerydus* in the structure of the legs.

Dr. Felder described five species in this genus, inhabiting Singapore, Java, Celebes, and Luzon. Of these Mr. Distant takes *subviolaceus* as the type, while Mr. Butler following Mr. Scudder takes *fallax*, which "emits the third and fourth subcostal branches from a long foot stalk beyond the cell" of the forewing, while *subviolaceus* has it "emitted at or near end of cell." Four species occur within strict Indian limits, and two of these are the largest of the group. The males of these two species above are dark brown, with a pale fascia on the forewing; the female of one species is white on the upperside, the apex, outer margin, posterior angle, and part of the inner margin of the forewing, with the costa of the hindwing black; the female of the other species is very like the male of the first, having a curved pale ochreous fascia on the upperside of the forewing on the disc. Both species in both sexes have an immense number of minute and larger-sized brown dots and spots sprinkled over the underside. *Allotinus alkamah*, Distant, is altogether different from *A. drumila*, Moore, and *A. multistrigatus*, mihi: it is only a little more than half the size, the upperside of both sexes has a large discal and basal patch of violaceous in both wings, and the markings of the underside are quite different in character, the ground-colour being profusely sprinkled with ochreous-brown spots very similar to those in *Paragerydus horsfieldi*, Moore. *Allotinus nivalis*, Druce, is again very distinct: both sexes are plain brown on the upperside without any markings whatever, the underside is white, spotted and mottled sparingly with brown, but in quite a different manner from *A. alkamah*. It is also smaller than that species. *A. multistrigatus*, *A. alkamah*, and *A. nivalis* in both sexes have the apex of the forewing simply acute, the outer margin entire (*A. nivalis* has it scalloped), the inner angle somewhat rounded. *A. drumila* has the apex highly acuminated, the outer margin scalloped, and the inner angle greatly produced. The genus is probably strictly confined to the Indo-Malayan region.

Key to the Indian species of Allotinus.

A. Inner angle of forewing greatly produced.
 624. A. DRUMILA, Sikkim, Assam.

B. Inner angle of forewing evenly rounded, not produced.
 a. Of large size, with a pale curved discal fascia on the upperside of the forewing.
  625. A. MULTISTRIGATUS, Kumaon, Sikkim, Bhutan, Assam, Lushai country.
 b. Of small size, both wings with disc and base above violaceous.
  626. A. ALKAMAH, Rangoon, Mergui, Malacca, Sumatra, Borneo.
 c. Of still smaller size, both wings above entirely brown.
  627. A. NIVALIS, Burma, Malay Peninsula, Borneo.

624. Allotinus drumila, Moore.

Miletus drumila, Moore, Proc. Zool. Soc. Lond., 1865, p. 777, pl. xli, fig. 12, *female*; *Gerydus drumila*, id., l. c., 1883, p. 521; *Miletus insignis*, Staudinger, Ex. Schmett., p. 269, pl. xciv, *female* (*nec* male) (1888).

HABITAT : Bengal, Darjiling, Khasias, Cachar, Lushai country.

EXPANSE : ♂ ♀, 1·75 to 2·2 inches.

DESCRIPTION : "MALE. UPPERSIDE, *both wings* dark umber-brown. *Forewing* with a pale medial longitudinal fascia curving from lower end of the cell across the disc. UNDERSIDE, *both wings* pale greyish-brown. *Forewing* with two pale-bordered transverse marks within the cell, one at its end, and another below the middle mark, a submarginal series of very irregular-shaped marks, and with several small pale-bordered irregular spots disposed about the discal area. *Hindwing* with three irregular-shaped pale-bordered cell-marks, four marks along anterior border, a discal confluent series ending at anal angle, two marks below the middle cell-mark, and three below the basal cell-mark, the middle one of the latter being black, small and round; interspersed between the marks are several pale-bordered irregular-shaped small spots." (*Moore*, l. c. in Proc. Zool. Soc. Lond., 1883.) [FE] " MALE. UPPERSIDE, *both wings* dull fuliginous-white, exterior margins scalloped. *Forewing* with the apex from the middle of the costa obliquely to below and near the middle of the exterior margin and thence retracing to posterior margin dark fuliginous-brown, with the tips of the veins on the costa brownish-white. *Hindwing* dark fuliginous-brown along anterior margin, with paler fuliginous marginal lunules. *Cilia* pale buff-coloured. *Antennæ* black. *Body* pale brown. UNDERSIDE, *both wings* very pale fuliginous-brown. *Forewing* with the disc broadly dull white, three short transverse brown bands within the cell, an irregularly-margined curved brown submarginal band, along the costa and exterior margin numerous small brown speckles. *Hindwing* with basal transverse pale-bordered marks, a short row of black-bordered dark brown pointed lunules proceeding from anal angle across the disc, with numerous brown speckles beneath it, and also on the anterior margin. *Palpi* and *body* beneath and *legs* pale brown." (*Moore*, l. c. in Proc. Zool. Soc. Lond., 1865.)

A rare species in Sikkim, Mr. Otto Möller possesses two males and three females, all taken in March and April. I also possess Sikkim specimens, and a male taken at Shillong in October. The Rev. Walter A. Hamilton possesses a female of this species taken in the Khasi Hills which has a broad black band extending down the abdominal margin of the hindwing on the upperside, but not quite reaching the extreme edge, no trace of which is found in the females from Sikkim that I have seen.

625. **Allotinus multistrigatus**, de N. (PLATE XXVI, FIGS. 157 ♂, 158 ♀).

A. multistrigatus, de Nicéville, Journ. A. S. B., vol. lv, pt. 2, p. 253, n. 5, pl. xi, fig. 11, *male*; 2, *female* (1886); id., Doherty, l. c., p. 131, n. 156; id., Elwes, Trans. Ent. Soc. Lond., 1888, p. 373, n. 234.

HABITAT : Askot, 5,000 feet, E. Kumaon; Sikkim; Bhutan; Shillong; Cherrapunji; Chittagong Hill Tracts; Sirtai Mountain, Lushai country.

EXPANSE : ♂, 2·1; ♀, 2·0 to 2·1 inches.

DESCRIPTION : "MALE. UPPERSIDE, *both wings* dark brown. *Forewing* with a pale brown elongated patch in the middle of the disc. *Hindwing* unmarked. UNDERSIDE, *both wings* pale ochreous-brown, covered (except the inner margin of the forewing) with hundreds of very minute spots, made up of a dark brown centre and fine outer pale line. *Forewing* with three similar but larger discoidal spots, and a fourth below the middle spot in the submedian interspace at the point where the first median nervule is given off; a similar submarginal series. *Hindwing* crossed by four almost equi-distant series of similar spots. *Cilia* pale brown throughout. FEMALE. Differs in having the forewing more truncate and the hindwing more deeply scalloped than in the male. UPPERSIDE, *forewing* with the discal patch very prominent and pale ochreous, the basal half of the costal margin narrowly pale ochreous, with four short streaks beyond. *Cilia* pale ochreous. Otherwise as in the male."

"Quite different from any species known to me." (*de Nicéville*, l. c.)

"The tarsi of this species are cylindrical, the first joint nearly twice as long as all the others combined. The egg is extremely flat, strongly bicarinate at the side, more than three times as wide as high, with the sculpturing all but obliterated above. The third subcostal nervule is given off opposite the end of the cell, for which reason I put it in the genus *Allotinus*.

Of the Indian species [of this group], *A. drumila*, Moore, is very much like *A. multistrigatus*; it likewise has the legs cylindrical, but the third subcostal nervule is emitted a little beyond the end of the cell." (*Doherty*, l. c.)

"This species, though structurally different, according to Mr. Doherty, from the last [*A. drumila*], is very like it in general appearance, and I had some difficulty in knowing whether Moore's description of the male of *A. drumila* does not apply to *A. multistrigatus*. The position of the third subcostal nervule and the shape of the hind margin of the forewing distinguish them." (*Elwes*, l. c.)

With reference to Mr. Doherty's remark regarding the position of the third subcostal nervule in the forewing in this species, it is given off very far beyond, not at the apex of the discoidal cell; the upper discoidal nervule is given off at the apex of the cell. The neuration in *A. drumila* and *A. multistrigatus* is exactly the same.

Mr. Otto Möller possesses three males and one female, the latter taken in June, of this species from Sikkim. I have a female taken in Bhutan in August by Mr. A. V. Knyvett's native collectors, and another from Cherrapunji taken in September.

The figures of both sexes were taken from examples from Sikkim in Mr. Otto Möller's collection, and shew both sides.

Allotinus unicolor, Felder, has been described as below* from Singapore. It does not appear to have been found in the Malay Peninsula since it was first met with there by Mr. Wallace.

626. **Allotinus alkamah,** Distant.

A. alkamah, Distant, Rhop. Malay., p. 452, n. 8, pl. xliv, fig. 3, *male* (1886).

HABITAT: Rangoon, Mergui, Malacca, Sumatra, Borneo.

EXPANSE: ♂, 1·05; ♀, 1·4 inches.

DESCRIPTION: "MALE. Allied to *A. subviolaceus*, Felder [Reise Novara, Lep., vol. ii, p. 286, n. 368, pl. xxxv, figs. 27, 28, *male* (1865), from Java], from which it differs on the UPPERSIDE of the *forewing* by the much larger violaceous area, and consequent considerable diminution in the width of the blackish margin to the same. UNDERSIDE, *both wings* as in *A. subviolaceus* (judging from Felder's figure), but having some distinct short transverse darker strigæ. FEMALE. UPPERSIDE, *both wings* as in the male, but the *hindwing* paler and more violaceous. UNDERSIDE, *both wings* as in the male," (*Distant*, l. c.)

Of this species I have seen but a single female specimen taken by Lieut. E. Y. Watson at Rangoon. It is the second smallest species of the genus occurring within strict Indian limits, and has the disc and base of both wings on the upperside in both sexes violaceous; the female has the hindwing suffused with whitish; both wings have a prominent linear black disco-cellular spot. The markings of the underside are nearer to those of *Paragerydus horsfieldi*, Moore, than to the other species of *Allotinus*, but they are more irregular in *A. alkamah*, and ochreous rather than brown.

627. **Allotinus nivalis,** Druce. (PLATE XXVI, FIG. 159 ♀).

Miletus nivalis, Druce, Proc. Zool. Soc. Lond., 1873, p. 348, n. 4; *Gerydus nivalis ?* Butler, Trans. Linn. Soc. Lond., Zoology, second series, vol. i, p. 546, n. 2 (1877); *Paragerydus nivalis*, Distant, Rhop. Malay., p. 207, n. 2, pl. xxii, fig. 11, *female* (1884); *Logania substrigosa*, Moore, Journ. A. S. B., vol. liii, pt. 2, p. 22 (1884); idem, id., Journ. Linn. Soc. Lond., Zoology, vol. xxi, p. 39, pl. iii, fig. 8, *female* (1886).

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* *Allotinus unicolor*, Felder, Reise Novara, Lep., vol. ii, p. 286, n. 369 (1865); id., Distant, Rhop. Malay., p. 209, n. 1 (1884); id., Distant and Pryer, Ann. and Mag. of Nat. Hist., fifth series, vol. xix, p. 266, n. 106 (1887). HABITAT: Singapore (*Felder*); Nias Island (*Kheil*); N. Borneo (*Distant*). EXPANSE: Not given. DESCRIPTION: "MALE. UPPERSIDE, rufescent-fuscous, darker towards the margin of the *forewing*. *Hindwing* with the *cilia* dull whitish, the margin before it darker. UNDERSIDE bluish-whitish, *cilia* swarthy-whitish, obsoletely at the end of the nervules spotted with blackish-fuscous; *both wings*, the internal margin of the forewing alone excepted, variegated finely with fuscescent, a submarginal series of small spots parallel with the margin fuscescent. *Forewing* with five irregular [*arrosis*] costal spots, a minute spot and a transverse litura in the cell, a disco-cellular fasciole, and an exterior fascia formed of six unequal spots. *Hindwing* with four minute basal spots, a pair of cellular spots, a disco-cellular irregular [*arrosa*] fasciole, two subcostal subbasal spots, two subcostal larger in the middle (the upper one more outwardly-placed), six others posterior in a series parallel with the margin (the two intermediate elongate, the rest equal, decreasing) and a seventh small internal hoary-brownish. *Abdomen* hoary-fuscous, whitish below."

"One specimen is the size of *A. fallax* [Felder, from Luzon], and with narrower wings than those of the female of *A. major* [Felder, from Celebes], the hindwings also are more toothed than in the latter species." (*Felder*, l. c.) The expanse of *A. fallax* is about 1·3 inches.

HABITAT : Tenasserim Valley, Mergui, Malacca, Borneo.
EXPANSE : ·83 to 1·00 inch.
DESCRIPTION : "MALE. UPPERSIDE, *both wings* dark brown. UNDERSIDE, *both wings* white, speckled with pale brown. *Forewing* with six black spots close to the outer margin. *Hindwing* with five." (*Druce*, l. c.) With reference to the last remark, Mr. Distant notes : "These spots would be more correctly described as marginal, and are scarcely reducible to the numbers given." FEMALE. "UPPERSIDE, *both wings* dark violet-brown. *Cilia* white between the veins. *Forewing* with a minute white dot at the end of the veins on the costa. UNDERSIDE, *both wings* purplish-white, crossed by a few ochreous-brown short strigæ, and with a thicker streak across the middle and end of the cell, and in a zig-zag submarginal series ; the outer marginal border ochreous-brown. *Forewing* with a marginal series of black spots. *Hindwing* with a lunular streak, and a black costal spot. *Body*, *antennæ*, and *legs* above brown ; *palpi*, *legs*, and *abdomen* beneath white." (*Moore*, l. c.) MALE agrees with the female in markings, but has the *forewing* more elongated, the costa straighter, the apex more acute.

Mr. Druce's description of this species is quite inadequate, but as far as it goes it agrees with the species which Mr. Moore described as *Logania substrigosa*. The type of the latter is in the Indian Museum, Calcutta, and was taken by Dr. J. Anderson on Kisseraing Island in the Mergui Archipelago on 1st January, 1882. The figure is taken from this specimen, which is a female, and shows both sides. I should not have ventured to put *P. nivalis* and *L. substrigosa* together, had not Mr. Doherty assured me that they are one and the same species, he having taken it in large numbers both in S.-E. Borneo and Burma, and at once recognised the identity of the specimens. He notes that it "obviously mimics *Neopithecops zalmora*, Butler, from which it is indistinguishable when flying."

In the next subgroup the legs are short. It contains the bulk of the Indian *Lycænidæ* in number both of genera and of species. This subgroup can be again divided by the structure of the legs, a single genus, *Logania*, Distant, which I place first, is unique in having the apex of the tibia of each leg swollen, while in every other genus of the family it is of uniform thickness throughout. It is very remarkable that it was only so lately as 1884 that the first species of the genus should have been described, as it is probable that this genus contains many species, which have a wide range in the Malay Peninsula and Archipelago. All the described species are small, and plainly coloured, they probably have a very weak flight, and escape the notice of the butterfly collector by their moth-like appearance. The males of *Logania* have no secondary sexual characters. The position of the genus is certainly very close to the three genera which precede it, as it has the same extraordinarily formed prehensores in the male, and a very similar egg, as Mr. Doherty informs me.

Genus 98.—LOGANIA, Distant. (FRONTISPIECE).

Logania, Distant, Rhop. Malay., p. 208, woodcut n. 61, posterior leg of *L. malayica*, Distant (1884).

"FOREWING, irregularly subtriangular, *costal margin* convex, the *apex* acutely produced, *outer margin* deeply and concavely sinuate, *inner* margin nearly straight ; *costal nervure* extending to near the middle of the costal margin, *first subcostal nervule* emitted a little beyond the middle of the cell, second midway between the base of the first and the apex of the cell, *third* and *fourth* bifurcating at about two-thirds the distance from the end of the cell and the apex of the wing ; bases of the third and second *median nervules* one-third nearer together than the bases of the second and first. HINDWING, elongate, the *costal margin* nearly straight, the *posterior* margin deeply sinuate, *first subcostal nervule* emitted a little before the end of the cell. *Palpi* very long, hirsute, the apical joint slender, but clothed with adpressed hairs. [*Antennæ* about half the length of the costa of the forewing, with a very slightly and gradually thickened club]. *Legs* with the apices of the tibiæ more or less globosely incrassated, the femora with a few slender spines."

"This pecular genus, which possesses superficially a Heterocerous appearance, is probably found throughout the Malay Peninsula." (*Distant*, l. c.)

In the forewing, the costa is regularly and evenly arched from the base to the apex, the apex is acuminate, the outer margin is scalloped but below the apex emarginated, then very

convex to the inner angle, the inner margin is very slightly sinuous; the costal nervure hardly reaches opposite to the apex of the discoidal cell, well-separated from the first subcostal nervule, which latter is well-separated from the second subcostal, the base of the second subcostal is nearer to the base of the first than to the base of the upper discoidal, the third subcostal nervule is rather long, and is given off from the subcostal nervure rather nearer to the apex of the wing than of the cell; terminal portion of subcostal nervure reaching the costa almost at, or very shortly before, the apex of the wing; upper discoidal nervule given off from the subcostal nervure far beyond the apex of the cell; middle disco-cellular nervule straight, strongly inwardly oblique; lower disco-cellular longer, concave, upright; second median nervule given off rather close to the lower end of the cell; submedian nervure lying close to the inner margin, following its outline. Hindwing much elongated, costa very straight, apex and outer margin rounded, the latter posteriorly scalloped; costal nervure unusually straight, but little bowed at the base; first subcostal nervule given off very near to the apex of the cell; upper disco-cellular nervule short, slightly inwardly oblique, straight; lower disco-cellular longer than the upper, upright, very concave; second median nervule given off immediately before the lower end of the cell; submedian nervure straight; internal nervure extremely short, nearly straight. I am indebted to Mr. W. Doherty for a pair of the type species, *L. malayica*, Distant, from S.-E. Borneo. The wings of the male specimen I have bleached, and describe its neuration as above.

Six species are at present known, two occurring in Borneo, two in the Malay Peninsula, two in the Mergui Archipelago, and one from Nias Island. They are all small butterflies, expanding about an inch, are dull-coloured or white on the upperside; four species have large patches of pale purple one on each wing, another species is white, with the outer margin of the forewing on the upperside broadly brown. They are all irregularly marbled and variegated on the underside.

Key to the Indian species of Logania.

A. Of large size, the pale violet-whitish patch of the forewing on the upperside anteriorly bounded by the median nervure; forewing with two subcostal nervules.
   628. L. ANDERSONII, Mergui.

B. Of smaller size, the pale violet-whitish patch of the forewing on the upperside anteriorly extending beyond the median nervure; forewing with three subcostal nervules.
   629. L. MARMORATA, Mergui.

628. Logania andersonii, Moore.

L. andersonii, Moore, Journ. A. S. B., vol. liii, pt. 2, p. 22 (1884); idem, id., Journ. Linn. Soc., Zoology, vol. xxi, p. 39, pl. iii, fig. 6, *female* (1886).

HABITAT: Mergui.

EXPANSE: ♀, 1·1 inch.

DESCRIPTION: "FEMALE. UPPERSIDE, *both wings* pale violet-brown. *Cilia* alternated with white. *Forewing* with a broad longitudinal medial lilacine-grey band of a somewhat triangular form, disposed below the cell, the exterior border of the band being scalloped. *Hindwing* with a narrow medial discal similar-coloured band. UNDERSIDE, *both wings* purplish lilacine-white, with a blackish zigzag cell-streak, a transverse discal zigzag duplex line, and two narrow similar submarginal lines, a slender marginal line, and a waved intereiliary line." (*Moore*, l. c. in Journ. A. S. B.)

In describing this species, Mr. Moore does not refer to the *Hypolycæna libna* of Hewitson, described from Borneo,* to which it is obviously allied, if not indeed identical. *L. libna* is described as having a small pale blue spot near the costal margin of the forewing on the upperside, which appears also to be present in *L. andersonii*, though not mentioned by Mr. Moore. The only difference I can detect is that the pale blue band on the upperside of the hindwing, as figured in *L. libna*, is larger than in *L. andersonii*, but, Hewitson's type having been a mutilated specimen, this feature may have been incorrectly drawn. The type and only known specimen

* Ill. Diurn. Lep., Suppl., p. 15, n. 24, pl. v Suppl., figs., 39, 40, *female* (1869).

of *L. andersonii* is in the Calcutta Museum, and was taken by Dr. J. Anderson on Kisseraing Island, Mergui Archipelago, on 1st January, 1882. It is obviously not a *Logania*, as it has only two subcostal nervules to the forewing, as in *H. libna*, as pointed out by Hewitson in describing that species; neither is it a true *Hypolycæna*, as it has no tails to the hindwing, and the first subcostal nervule of the forewing just after its origin touches the costal nervure. As the type of *L. andersonii* is still unique, and I have not been able to procure a specimen for dissection and correct description of the neuration, I leave the species for the present in the genus *Logania* where Mr. Moore had placed it, proposing for it provisionally the new generic name *Cyaniriodes* in allusion to the character of the markings of the underside, which resemble those of *Cyaniris* in such a manner as to lead to the suspicion that it is a mimic of some species of that genus, but especially on account of the difference in neuration which has been detected by Mr. Doherty.

629. **Logania marmorata**, Moore. (FRONTISPIECE, FIG. 128).

L. marmorata, Moore, Journ. A. S. B., vol. liii, pt. 2, p. 22 (1884); idem, id., Journ. Linn. Soc., Lond., Zoology, vol. xxi, p. 39, pl. iii, fig. 7 (1886).

HABITAT: Mergui.

EXPANSE: ·8 to 1·0 inch.

DESCRIPTION: "UPPERSIDE, *both wings* pale purplish violet-brown, the traversing veins being pale violet-brown. *Cilia* violet-brown. *Forewing* with the basal half, curving obliquely from the middle of the costa to the posterior margin near the angle, violaceous-white. *Hindwing* with the lower basal and discal areas also violaceous-white. UNDERSIDE, *both wings* densely mottled with purplish violet-brown and violet-white, interspersed with black speckles, which are most prominent in a lunular marginal fascia; a white spot at the end of the cells. *Body, antennæ*, and *legs* violet-brown." (*Moore*, l. c.)

There are two specimens of this species in the Indian Museum, Calcutta, taken by Dr. J. Anderson, on Elphinstone Island, Mergui Archipelago, on 2nd and 9th March, 1882.

The figure shows both sides of the type specimen in the Indian Museum, Calcutta.

Logania malayica, Distant, and *L. sriwa*, Distant, have been described from the Malay Peninsula as below.*

In the next division, which I call the *Poritia* group, I have placed three genera. *Zarona*, mihi, and *Poritia*, Moore, have all of the first subcostal nervule of the forewing completely anastomosed with the costal nervure except a small portion of the base, which alone is free. I have seen no specimen of *Pseudodipsas*, Felder, and hence am unable to say whether or not it possesses this neural character, which is strictly confined to this group of Indian *Lycænidæ*, and to the genera

* *Logania malayica*, Distant, Rhop. Malay., p. 208, n. 1, pl. xxii, fig. 21, *female* (1884). HABITAT: Sungei Ujong, Malay Peninsula; S.-E. Borneo. EXPANSE: *Male*, ·9; *Female*, ·9 to 1·2 inches. DESCRIPTION: "FEMALE. UPPERSIDE, *both wings* white. *Forewing* with the costal margin narrowly fuscous, and the apical area narrowing to outer angle of the same colour. *Hindwing* with the outer margin very narrowly fuscous. UNDERSIDE, *both wings* white, thickly and irregularly mottled with brown. *Body* and *legs* brownish." (*Distant*, l. c.) Mr. W. Doherty has taken this species in S.-E. Borneo, and has given me a pair of specimens. The male does not differ from the female except in its smaller size.

Logania sriwa, Distant, Ann. and Mag. of Nat. Hist., fifth series, vol. xvii, p. 531 (1886); idem, id., Rhop. Malay., p. 452, n. 2, pl. xliv, fig. 16 (1886). HABITAT: Malacca. EXPANSE: ·95 inches. DESCRIPTION: "UPPERSIDE, *both wings* violaceous-white. *Forewing* with the costal margin spotted with fuscous, and the apical area (not quite reaching to the outer angle) dark fuscous. *Cilia* of the hindwing spotted with fuscous. UNDERSIDE, *both wings* fuscous-brown with darker blotches, and irrorated and speckled with greyish-white; this whitish coloration is most prominent on the forewing at the apex and outer angles, and on the hindwing it appears as an irregular broad subcostal streak. *Hindwing* also more darkly marked than the forewing. *Body* above brownish, beneath greyish; *legs* very pale brownish with dark annulations." (*Distant*, l. c.)

Mr. Doherty records this species (Journ. A. S. B., vol. lviii, pt. 2, p. (1889) from Mergui, where the types of *L. marmorata*, Moore, were procured. I have seen the single female he obtained; it appears to differ from *L. marmorata* only by the greater prominence of all the markings of the underside. I am very much inclined to think that *L. sriwa* cannot stand as a species distinct from *L. marmorata*, and most likely the "*Miletus*" *lahomius* of Kheil (Rhop. Insel Nias, p. 27, n. 77, pl. v, figs. 28, 29 (1884), from the Island of Nias, will hereafter be proved to be another synonym of the same species. Mr. Doherty, speaking of this Mergui specimen of *L. sriwa*, says that: "It is very possibly distinct from *L. marmorata*, Moore, but the bad state of the types of that species makes it difficult to decide. On account of the short legs, I retain this species in *Logania*, though the tibiæ are but slightly thickened. Between this form and the true *Loganias*, with the 'apices of the tibiæ globosely incrassated,' I believe every gradation can be found. Of the true *Loganias* a species [undescribed] occurs at Bassein, Burma; it is one of the smallest and obscurest of Indian butterflies. The type species, *L. malayica*, Distant, seems rare in the Malay Peninsula (where a number of other forms occur), but I found it rather common in south-eastern Borneo. The genus is also represented in Celebes."

Pithecops, Horsfield, and *Una*, mihi, as far as I am aware. The genus *Zarona* contains only two species known to me at present, and shares with the otherwise totally dissimilar genera *Dacalana*, Moore, and *Liphyra*, Westwood, the unusual feature of having four subcostal nervules (excluding the terminal portion of the subcostal nervure often called an additional subcostal branch) to the forewing in both sexes. Mr. Distant says that this character is found also in his genus *Deramas*, which I have not seen. The male of *Z. jasoda*, mihi, is very similar in general appearance to some species of the genus *Poritia*, the bright colouring of the upperside being blue in some lights, green in others. It has no secondary sexual characters. The genus *Poritia* contains some of the most beautiful species of the *Lycænidæ*, the males being as richly glossed on the upperside with blue in some lights, as they are with emerald-green in others. When the species of this genus come to be carefully examined as to their structure, it will probably be found that many of them do not belong to *Poritia*, but have the neuration of one or other of the genera of the group. The males of *Poritia* have well-developed sexual tufts of hairs on the wings. I am unaware if *Pseudodipsas* possesses similar characters. All the species of the group seem to be very rare.

Genus 99.—ZARONA, nov. (Frontispiece and Plate XXV).

Forewing, *costa* slightly and regularly arched, *apex* rather acute, *outer margin* nearly straight below the apex in the male, convex in the female, *inner* margin straight; *costal nervure* extending beyond the apex of the discoidal cell; *first subcostal nervule* given off from the subcostal nervure about two-thirds of the length of the cell from the base, completely anastomosed with the costal nervure; *second* subcostal with its base nearer to that of the first than to that of the upper discoidal; *third* subcostal with its origin about midway between the apex of the cell and of the wing; *fourth* subcostal given off midway between the base of the third and the apex of the wing, reaching to the apex of the wing; terminal portion of subcostal nervure extending to the outer margin below the apex of the wing; *middle disco-cellular* nervule very short, with an apparently common origin with the upper discoidal; *lower* disco-cellular about three times as long as the middle disco-cellular; *second median* nervule emitted a little before the lower end of the cell. Hindwing, entire, elongated in the male, the outer margin very straight in the male, giving the wing a truncated appearance, the wing broader in the female, the outer margin evenly rounded; *first subcostal nervule* given off rather near to the apex of the cell; *upper disco-cellular* nervule short, straight, outwardly oblique; *lower* disco-cellular longer than the upper, concave, slightly outwardly oblique; *second median* nervule given off immediately before the lower end of the cell. Body moderately robust, *abdomen* rather short; *antennæ* short, with a long, gradually-formed club. Male with no secondary sexual characters. Type, *Zarona jasoda*, mihi.

There may be some slight inaccuracies in the diagnosis of this genus given above, as it has been drawn up from the two unique type specimens on which the genus is based, and which I have consequently only been able to examine by clarifying with benzine. The genus, though evidently closely allied to *Deramas*, Distant, may be known by the males possessing no tuft of long hairs in the discoidal cell of the hindwing on the upperside. The shortness of the middle disco-cellular nervule of the forewing is unusual, but this may also be a feature of *Deramas*.

Key to the species of Zarona.

A. Male, underside, both wings with the ground-colour deep glossy purplish-brown; hindwing with discal band slightly outwardly marked with grey.
630. Z. jasoda, Burma.

B. Female, underside, both wings with the ground-colour dull reddish-purplish; hindwing with discal band not outwardly margined with grey.
631. Z. zanella, Burma.

630. Zarona jasoda, de N. (Plate XXV, Fig. 144 ♂).

Z. jasoda, de Nicéville, Journ. A. S. B., vol. lvii, pt. 2, p. 280, n. 9, pl. xiv, fig. 5, *male* (1888).

Habitat: Pegu Hills, Burma.

Expanse: ♂, 1·4 inches.

Description: "Male. Upperside, *both wings* black. *Forewing* with a streak on either side of the median nervure, a small patch filling the base of the second median and a

larger one filling the base of first median interspace, a lengthened streak in the interno-median area, and placed outwardly obliquely above it is a large somewhat quadrate patch in the submedian interspace, all brilliant shining ultramarine-blue inclining to brilliant emerald-green in some lights. *Hindwing* with the posterior two-thirds of the surface also blue crossed by the black veins, the outer margin narrowly black, and with somewhat diffused black spots placed upon and near the termination of the median nervules, two conjoined spots in continuation of these latter in the submedian interspace; costal and abdominal margins pale fuscous. UNDERSIDE, *both wings* deep glossy purplish-brown. *Forewing* with a discal macular irregular fascia, and with a double series of indistinct marginal lunules; inner margin pale. *Hindwing* with a very irregular discal macular fascia, outwardly slightly defined with whitish; marginal lunules much as in the forewing, some indistinct plumbeous irrorations towards the anal angle."

"Nearest to '*Poritia*' *pharyge*, Hewitson, from Perak and Borneo [described below*], from which it may at once be distinguished by the absence of the three subapical and six marginal blue spots, and by the presence of the broad streak in the interno-median area on the upperside of the forewing; by the much greater extent of blue coloration on the upperside of the hindwing; the markings of the underside also are very different."

"Described from a single specimen in the collection of Major C. T. Bingham, who captured it in December, 1887." (*de Nicéville*, l. c.)

The figure shows both sides of the male type specimen in Major Bingham's collection.

631. **Zarona zanella,** n. sp. (FRONTISPIECE, Fig. 125 ♀).

HABITAT: Upper Tenasserim.

EXPANSE: ♀, 1·45 inches.

DESCRIPTION: FEMALE. UPPERSIDE, *both wings* fuscous. *Forewing* with the costa, the upper half of the discoidal cell, giving off a wedge-shaped process covering the disco-cellular nervules, the apex widely, the outer margin widely but decreasingly, and all the veins alone fuscous, the rest of the wing purple, the portion of that colour occupying the lower half of the cell with its anterior margin waved. *Hindwing* with a patch of purple in the middle divided by the fuscous veins. UNDERSIDE, *both wings* dull reddish-purplish. *Forewing* with a discal macular narrow line formed of linear spots rather darker than the ground from the upper discoidal nervule to the submedian nervure, two extremely indistinct marginal fasciæ. *Hindwing* with a discal fascia as in the forewing, but highly irregular, the marginal fasciæ as in the forewing, a small round black spot a little removed from the margin in the submedian interspace. *Cilia* reddish-ochreous throughout.

I can compare this plainly-coloured simply-marked butterfly with no other; as far as I know it is quite unique, though it is possible that hereafter it may be proved to be the opposite sex of *Z. jasoda*, mihi, from which it differs in the much paler colour of the ground on the underside, in the discal band on the hindwing not being slightly outwardly marked with grey, and the grey irroration at the anal angle being absent. The type and only known specimen was taken in the Meplay Valley, Upper Tenasserim, Burma, on the 8th January, 1882, by Major C. T. Bingham.

The figure shows both sides of the type specimen in my collection.

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* *Zarona ? pharyge*, Hewitson. *Poritia pharyge*, Hewitson, Trans. Ent. Soc. Lond., 1874, p. 345; idem, id., Ill. Diurn. Lep., p. 215, n. 5, pl. lxxxviii, figs. 8, 9, *male* (1878); id., Distant, Rhop. Malay., p. 450, n. 8, pl. xli, fig. 8, *male* (1886). HABITAT: Perak, Borneo. EXPANSE: 1·15 to 1·35 inches. DESCRIPTION: "MALE. UPPERSIDE, *both wings* black, marked by bands and spots of green. *Forewing* witb a band from the base and on the inner margin, a trifid spot near the costal margin, and a submarginal series of five spots. *Hindwing* with a band near the inner margin, two spots beyond the middle, and three on the outer margin. UNDERSIDE, *both wings* rufous-brown. *Forewing* with a spot before the middle, a linear broken band at the middle, and a submarginal band of indistinct, brown spots. *Hindwing* crossed beyond the middle by three bands of spots, a linear blue band on the outer margin." (*Hewitson*, l. c.) MALE. "UPPERSIDE, *both wings* blackish, with the following bluish-green markings. *Forewing* with a longitudinal fascia along the median nervure, a curved fascia on base of inner margin, three subapical spots and a marginal series of six spots. *Hindwing* with a longitudinal fascia along the submedian nervure, two discal and three marginal spots, costal area brownish. UNDERSIDE, *both wings* brownish. *Forewing* with a dark linear disco-cellular spot, followed by two linear fasciæ crossing the wing which are more or less margined with greyish. *Hindwing* with a dark linear disco-cellular spot, two discal narrow waved dark fasciæ more or less margined with greyish, a similarly-coloured and margined waved fascia extending from the third median nervule to the anal angle, and a marginal narrow bluish and black fascia at the same area." (*Distant*, l. c.)

I have not seen this species. It would be interesting to know whether or not it possesses four subcostal nervules to the forewing; Mr. Distant placing it in the genus *Poritia* and not in *Deramas* would appear to show that it has three only.

Z. bradamante, Doherty, MS., occurs in Lower Siam. Its description is appended.* It was drawn up from a single specimen. All the species of the *Poritia* group occurring in the Malay Peninsula seem to be extremely rare.

I append as a foot note† a description of the genus *Deramas*, Distant, which belongs to the *Poritia* group. This group is a very small and interesting one : it would be very desirable to monograph it, and to place in their proper genera the various species which have been described as *Poritia*, but which do not belong to that genus.

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* *Zarona bradamante*, n. sp., Doherty, MS. HABITAT : Lower Siam. EXPANSE : Not given. DESCRIPTION : " MALE. UPPERSIDE, *both wings* black, basal part of forewing and half the hindwing bright bluish-green, the tint varying in different lights. (This is caused by the scales being slightly bent downwards at the end, the basal three-fourths being green, the terminal fourth blue. Viewed from certain directions, only the blue tips of the scales are visible ; from others, only the green bases.) This green space occupies the lower part and end of the discoidal cell, the basal part of the median interspaces, the interno-median interspace where it projects to one-fifth from the margin, and the interspace from the submedian nervure to the inner margin, not extending so far outwards ; an oblique dark streak in the green in the middle of the interno-median interspace, and a longer one along its upper edge ; the veins slenderly black. *Hindwing* has the green colour extending over most of the disc from the second subcostal nervure to the submedian nervure, marginal line black, the discoidal cell powdered with green basally ; a black submarginal transverse streak in the interno-median interspace, the veins not perceptibly black ; abdominal margin clothed with long hairs. *Cilia* black. UNDERSIDE, *both wings*, ground dark rufous-brown with a slight violet lustre, paler outwardly, a transverse discal line of darker streaks bordered outwardly with paler, the three upper streaks on the forewing placed beyond the line of the others, those on the hindwing placed very irregularly ; an obscure series of paler lunules, somewhat irregular on the hindwing, that in the interno-median interspace broadly sagittate, enclosing a white-powdered spot ; a paler line close to the margin ; marginal line anally on the hindwing black, inwardly defined with whitish. *Cilia* rufous. PREHENSORES, seen from the side. *Uncus* quadrate, the angles rounded, branches very slender, hooked at the tip, angled in the middle. *Clasps* irregularly quadrate at the end, the lower angle acute, a long hirsute process or beak deflexed at the tip, proceeding from the upper angle, above the base of which is a tubercle."

" One male, taken in deep forest at Kulim, State of Kedah, Lower Siam, not much above the sea level. It differs from *Deramas livens*, Distant, in the colour of the upperside, which is bluish-green instead of 'dark cerulean-blue,' in the colour of the underside which is dark rufous-brown instead of 'pale brownish-ochraceous, suffused submarginally with grey,' in the presence of the two black marks on the forewing above, and in the absence of the sexual tuft." (*Doherty*, MS.)

Mr. Doherty placed this species in Mr. Distant's genus *Deramas*, but as that genus possesses a tuft of hairs in the male which is lacking in *bradamante*, I have thought it better to place it in *Zarona*, mihi. Mr. Doherty gives the following description of the structural characters of his type specimen of *bradamante*. These differ in several particulars from the two species I have placed in *Zarona*, and hence it appears to me probable that *bradamante* should have made the type of a new genus.

" Forewing with the costa strongly convex at base, thence straight nearly to apex, not emarginate in the middle as in *Poritia*, Moore ; apex rather acute ; outer margin slightly convex, inner margin strongly convex near the middle ; costal nervure thickened, strongly bent in the middle, ending two-fifths before the apex ; the first subcostal nervule short, slender, originates one-third before the end of the discoidal cell, anastomoses with the costal nervure not far from its origin and does not again separate from it ; second subcostal from one-sixth before the end of the cell ; third subcostal originates at two-fifths of the distance between the cell and the apex ; fourth subcostal thence halfway to the apex ; upper discoidal nervule from the upper angle of the cell ; middle disco-cellular nervule less than one-third as long as the lower ; median nervules with their bases remote from each other, the second median originating well before the end of the cell ; submedian nervure straight ; discoidal cell widest two-thirds from the base, the end regularly concave. Hindwing elongate, triangular, the costa, apex and anal angle rounded, the outer margin nearly straight for some distance, no tails ; costal nervure robust at base, strongly bent beyond it, not attaining the apex ; first subcostal nervule originates considerably before the end of the cell ; second median nervule from its end ; upper disco-cellular nervule half as long as the lower ; discoidal cell with its end oblique ; internal nervule rather long. Antennæ rather thick, gradually clavate, the end abrupt, articulations about forty-four. Palpi with the last joint one-third as long as the preceding one, slender, acicular, with few scales. Eyes naked. Hindlegs with the first joint of the tarsus enlarged, thicker and about as long as the tibia, longer than the other joints united, the pulvillus very broad. Forelegs as in *Massaga*, Doherty, the tibiæ and tarsi thicker, the tarsi less clavate, with longer spines, not articulate " (*Doherty*, MS.)

† Genus DERAMAS, Distant.

Deramas, Distant, Ann. and Mag. of Nat. Hist., fifth series, vol. xvii, p. 252 (1886) ; idem, id., Rhop. Malay., p. 450 (1886).

" Closely allied to *Poritia*, Moore. FOREWING, differs in possessing five instead of four subcostal nervules ; *first subcostal nervule* very short, emitted at about one-third before the end of the discoidal cell, and joins the costal nervure ; *second* subcostal emitted nearer first than third ; *third* subcostal from the end of the cell ; *fourth* subcostal bifurcating from third at about half its length ; *fifth* subcostal bifurcating from third about midway between the base of the fourth and the apex of the wing." (*Distant*, l. c. in Rhop. Malay.)

As far as is known but a single species comes into this genus. *D. livens*, Distant, is described as possessing a cellular tuft of long hairs on the upperside of the hindwing in the male. It is recorded from Singapore. On the upperside the lower discal area of the forewing occupying rather less than one-third the total area of the wing and the disc of the hindwing are rich blue ; the underside is very inconspicuously marked.

Deramas livens, Distant, Ann. and Mag. of Nat. Hist., fifth series, vol. xvii, p. 252 (1886) ; idem, id., Rhop. Malay., p. 451, n. 1, pl. xlii, fig. 15, *male* (1886). HABITAT : Singapore. EXPANSE : *Male*, 1·2 inches. DESCRIPTION : " MALE. UPPERSIDE, *both wings* dark cœrulean-blue. *Forewing* with the neuration, the costal, cellular, and apical areas, outer margin narrowly, to outer margin, and inner margin narrowly, dark fuscous. *Hindwing* with a cellular tuft of long hairs ; costal and abdominal areas, posterior margin, and a more or less continous series of marginal spots placed on the nervules dark fuscous. UNDERSIDE, *both wings* pale brownish-ochraceous, with a narrow, linear, much waved and dislocated, castaneous fascia, between which and the outer margin the colour is much suffused with greyish. *Hindwing* with a short, narrow, strongly waved linear blackish fascia at the anal angle. *Body* and *legs* more or less concolorous with the wings." (*Distant*, l. c. in Rhop. Malay.)

Genus 100.—Poritia, Moore. (Plate XXVI).

Poritia, Moore, Proc. Zool. Soc. Lond., 1865, p. 775; id., Hewitson, Ill. Diurn. Lep., p. 213 (1878); id., Distant, Rhop. Malay., p. 197 (1884); *Simiskina*, Distant, Entomologist, vol. xix, p. 12 (1886); idem, id., Rhop. Malay., p. 450 (1886); *Massaga*, Doherty, Journ. A. S. B., vol. lviii, pt. 2, p. (1889).

"Wings, short, very broad. Forewing, with the costa slightly concave in the middle; *outer margin* straight, slightly oblique [convex in the female], *inner margin* nearly as long as the costa, *inner angle* acute; *subcostal nervure* with its first branch arising at one-third from its base and extending to the costa beyond one-third of its length, third remote, fourth arising from the second at one-fourth of the length of the first. Hindwing, very convex near the base, concave in the middle; *apex*, *exterior margin*, and *anal angle* rounded, scalloped. *Eyes* naked; *palpi* long, third joint slender, one-third the length of the second, finely pointed at the tip; *antennæ*, slender at the base, club moderate; *legs* short, stout, femora slightly pilose beneath; *thorax* stout; *abdomen* moderate, extending to two-thirds of the length of the hindwing." (*Moore*, l. c.)

"Wings, short and broad. Forewing, with the *costal margin* slightly concave about the middle, *outer margin* oblique, nearly straight or slightly rounded, *inner* margin slightly concave at the base, and then sinuated to outer angle (prominently in the male and obscurely in the female); *first subcostal nervule* emitted at about one-third from the end of the cell, *second* near end of cell, *third* emitted a short distance from apex of second.* Hindwing, convex at base, and suddenly oblique to apex [in the male]; *posterior margin* rounded and convex; provided in the male with a long tuft of hairs near the base of the cell. *Eyes* naked; *palpi* long, the apical joint slender and pointed at apex; *legs* stout, femora pilose beneath; *antennæ* gradually increasing in thickness from the base, and terminating in a somewhat long and moderately thickened club; *thorax* robust."

"The species of *Poritia* exhibit a brilliancy of colour and markings which forcibly remind a lepidopterist of the glories of the Neotropical *Erycinidæ* [= *Nemeobiinæ*.] The genus was founded by Mr. Moore for the reception of a N.-E. Indian species, but *Poritia* has since been shown, and principally by Mr. Hewitson, to have its head-quarters and to reach its maximum of species in the Indo-Malayan region. Some thirteen species are described, and of these no less than eight are found in [the Malay Peninsula] fauna." (*Distant*, l. c.)

In the type species of this genus, *P. hewitsoni*, Moore, the costa of the forewing is slightly emarginate near the middle; the outer margin is slightly convex; the first subcostal nervule arises just before the second, and almost immediately runs into the costal nervure, with which it entirely anastomoses and from which it does not subsequently become free, the amalgamated vein being long, ending on the costa considerably beyond the apex of the cell; the second arises about one-third before the apex of the discoidal cell and reaches the outer margin exactly opposite the origin of the third subcostal; this latter being very short, and arising about two-thirds beyond the apex of the cell. There are, therefore, three distinct subcostal nervules to the forewing in the type species, exclusive of the terminal portion of the subcostal nervure, which Mr. Distant counts as an additional subcostal nervule. Neither of the three authors† who have examined the neuration of this genus seem to have discovered the first subcostal nervule, which owing to its shortness and complete anastomosis with the costal nervure, except in a short free basal portion, might be easily overlooked. Upper disco-cellular nervule short, one-third the length of the lower disco-cellular, straight; second median nervule given off some distance before the apex of the cell. In the male, in the forewing, on the underside, there is a large somewhat quadrate shining patch of differently-formed and large scales from the

* "Mr. Moore describes the subcostal nervules as four in number; Mr. Hewitson corrects Moore, and says there are but two [one of Mr. Moore's subcostal nervules being the upper discoidal nervule]; according to my view there are three." (*Distant*, l. c.)

† I find that Mr. Distant in the Appendix to his 'Rhopalocera Malayana,' p. 450, has the following note:—"In my diagnosis of this genus, I stated that, 'according to my view there are three' subcostal nervules to the forewing. Mr. Moore has since pointed out to me that there are four, the first being very short and minute."

inner margin to the median nervure near the base of the wing, and on the hindwing on the upperside another patch of scales of the same shape from the subcostal nervure to the costa. In the hindwing the costal nervure is strongly arched near its base and very short, the upper disco-cellular nervule is straight, outwardly oblique, and considerably shorter than the lower disco-cellular; the second median nervule given off immediately before the end of the cell. The males possess on the upperside of the hindwing a second tuft or pencil of long black hairs which have hitherto been overlooked, springing from near the base of the submedian nervure, and lying along the abdominal margin, the basal area of which margin from the submedian nervure to the margin is furnished with a patch of scales similar to those on the costa of the hindwing and inner margin of the forewing.

Six species of this very beautiful genus occur within Indian limits, the males of all of which have the upperside of both wings black, with patches varying in size and shade of rich blue or green. The female of one species, *P. hewitsoni*, Moore, has a few blue and ferruginous spots on the upperside of both wings; another, *P. phraatica*, Hewitson, has ferruginous patches only; a third, *P. pleurata*, Hewitson, is nearly as blue as the male, but the shade of colour is much lighter, and does not usually change with the incidence of the light, and there are two series of black lunules near the outer margin of the hindwing. The underside of both sexes of these three species is pale brownish, with very numerous closely-arranged bands of black or ferruginous-outlined spots. The other group, which also contains three species, has the markings of the underside in both sexes quite different; the ground-colour is more or less ferruginous, and the markings, instead of being closely-arranged annular bands, consist of narrow dark linear bands in two species; the third species has a broad white band. The female of *P. hartertii*, Doherty, is unknown, as also is that of the allied *P. phalena*, Hewitson, from Singapore; the female of *P. potina*, Hewitson, is bright orange, the apex and outer margin of the forewing on the upperside broadly black, the hindwing more or less marked with black; the female of *P. pediada* is, if possible, even more aberrant than that of *P. potina*, being entirely fuliginous on the upperside. Mr. Distant has proposed a new genus and a new species for the female of *P. potina*, calling it *Simiskina fulgens*, and placed the species in the subfamily *Nemeobiinæ* next after the genus *Abisara*, Felder.* As far as I know every butterfly of the family *Nymphalidæ* has a præcostal nervure to the hindwing, while every species of the family *Lycænidæ* lacks this vein; by this one character I believe the two families to be invariably separable. This vein is wanting in *Simiskina*. Mr. Doherty ignores Mr. Distant's most inadequately-described genus *Simiskina*, and proposes a new genus *Massaga* for *P. hartertii*, *P. potina*, and *P. pediada*; his description will be found below in a foot note.†

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* Genus *Simiskina*, Distant, Entomologist, vol. xix, p. 12 (1886); idem. id., Rhop. Malay., p. 450, (1886). "This genus differs from *Abisara*, Felder, in having the lower disco-cellular nervule of the HINDWING much longer than the upper, thus resembling *Stiboges*, Butler; but from that genus it is easily distinguished by the subcostal nervules of the hindwing, which bifurcate before the upper end of the cell. In shape of wings and general superficial features *Simiskina* resembles *Abisara*." (*Distant*, l. c. in Rhop. Malay.) Dr. Staudinger agrees with Distant in considering this genus to belong to the *Nemeobiinæ*. (Ex. Schmett., p. 275 (1888).

† Genus *Massaga*, Doherty, Journ. A. S. B., vol. lviii, pt. 2, p (1889) "FOREWING, *upper discoidal nervule* originates a little beyond the cell, so that there is no trace of an upper disco-cellular nervule [in the *Lycænidæ*, according to my views, there is never any upper disco-cellular nervule]; the *middle* disco-cellular nervule is rather stout and oblique; the *lower* disco-cellular distinct, sinuous. HINDWING, *discoidal cell* longer than in *Poritia*, Moore; *upper disco-cellular nervule* short, very oblique; *lower* disco-cellular long; *second median* nervule originates considerably before the lower end of the cell. On the underside the ring-markings of *Poritia* are replaced by simple transverse lines. The apex of the forewing is more pointed and is usually slightly falcate in both sexes, the upper part of the outer margin being slightly excised. The tuft of the male is inconspicuous in itself, but is placed on a conspicuous ochreous patch. The hindwing of the female is conspicuously angled. The sexes are exceedingly unlike. The genus is close to *Deramas*, Distant, and *Zarona*, de Nicéville, which it greatly resembles, but differs in having one subcostal nervule the less in the forewing." (*Doherty*, l. c.)

Mr. Doherty first described this genus in a paper sent to Calcutta for publication in 1886; this paper, however, never appeared. As the genus *Simiskina* has been described so inadequately, and is, moreover, placed in a wrong family and the type species based on a synonym, Mr. Doherty considers that the laws of priority in this case should be ignored, and that his name *Massaga* should stand. This is his description of the genus in that paper: "Allied to *Deramas*, Distant, but having three subcostal nervules to the forewing only. FOREWING, *first subcostal nervule* anastomosed with the costal nervure just as in *Deramas*; *third* subcostal given off from the subcostal nervure three-fifths from the cell to the apex; *upper discoidal* nervule given off from the subcostal nervure some distance beyond the apex of the cell; *middle disco-cellular* nervule very short, *lower* disco-cellular.

The genus *Poritia* is a particularly difficult one, as the males of several species appear to possess no constant characters by which to distinguish them; while the females, though variable, present considerable and well-marked differences. The blue markings in the female on the upperside when present are iridescent, as are those of the male, but to a rather less extent. All the species appear to be rare and but seldom caught in perfect condition.

The complete transformations of no species of the genus is known, but a description of the pupa of *P. hartertii*, Doherty, will be found under the description of that species.

The genus appears to be strictly confined to the Indo-Malayan region. In India it occurs only in Sikkim eastwards to Assam, thence southwards through Burma to Singapore, several species being found in Sumatra, Java, and Borneo.

Key to the Indian species of Poritia.

A. Both sexes, underside, both wings closely covered with catenulated bands of annular spots.
- *a.* Female, upperside, both wings more or less marked with blue.
  - *a*¹. The blue coloration less extensive than the black, often with some ferruginous spots on the forewing.
    - 632. P. HEWITSONI, Kumaon, Sikkim, Assam, Chittagong Hill Tracts, Upper Burma, Tavoy.
  - *b*¹. The blue coloration more extensive than the black, never with ferruginous spots on the forewing.
    - 633. P. PLEURATA, Burma, Malay Peninsula.
- *b.* Female, upperside, both wings with discal orange patches.
    - 634. P. PHRAATICA, Mergui, Malay Peninsula, Siam.

B. Both sexes, underside, both wings without annular markings, but with simple transverse lines.
- *a.* Male, underside, both wings with a broad white discal band.
    - 635. P. HARTERTII, Upper Assam.
- *b.* Both sexes, underside, both wings with no broad white discal band.
  - *a*¹. Female, upperside, both wings orange, with black outer margins.
    - 636. P. POTINA, Tenasserim Valley, Penang, Malacca, Singapore.
  - *b*¹. Female, upperside, both wings fuliginous, immaculate.
    - 637. P. PEDIADA, Tenasserim Valley, Singapore.

632. Poritia hewitsoni, Moore.

P. hewitsoni, Moore, Proc. Zool. Soc. Lond., 1865, p. 775, pl. xli, fig. 10, *male*; id., Hewitson, Ill. Diurn. Lep., p. 214, n. 1, pl lxxxviii, fig. 1, *female* (1878); id., Staudinger, Ex. Schmett., p. 275, pl. xcv, *male* (1888); *P. hewitsonii*, var. *tavoyana*, Doherty, Journ. A. S. B., vol. lviii, pt. 2, p. (1889).

HABITAT: Kali Valley at Garjiaghat, Kumaon; Sikkim; Bengal; Assam; Chittagong Hill Tracts; Upper Burma; Tavoy.

EXPANSE: ♂, 1·20 to 1·50; ♀, 1·40 to 1·60 inches.

DESCRIPTION: "MALE. UPPERSIDE, *both wings* jet-black. *Forewing* with the lower part of the base from beneath to beyond the cell and extending into the black of the exterior margin brilliant deep blue, or in some lights emerald-green, in the middle of which is an elongated black spot, a row of very small similar brilliant blue spots obliquely before the apex and along the exterior margin. *Hindwing* with the same brilliant blue extending

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deeply concave; *second median* nervule originates considerably before the lower end of the cell. HINDWING broad, *outer margin* scalloped, *costal nervure* shorter than in *Deramas*, ending considerably before the apex of the wing; *second subcostal nervule* originates considerably before the end of the cell, *second median* nervule even more so; *discoidal cell* with its end truncate, not oblique; *upper disco-cellular nervule* oblique, hardly half as long as the lower; *lower disco-cellular* regularly and strongly incurved. *Antennæ* more slender than in *Deramas*, the club more distinct; *palpi* with the last joint still longer and more slender and acute. *Hind legs* with the first joint of the tarsi not perceptibly swollen. *Fore legs* with the femur enlarged, longer than the tibia; tarsus hardly two-thirds as long as the tibia, clavate, not articulate, with a few short spines, claws small, slender, partially concealed, accompanied by the usual hairs, but with no paronychia. *Middle* and *hind legs* with five distinct joints, claws, paronychia, and pulvillus. Male with a tuft of long hairs on the upperside of the hindwing in the cell. This description is based on a single male of *M. cloninda*." This MS. species is the male of *P. potina* Hewitson.

As Mr. Doherty describes his genus *Massaga* in comparison with *Poritia*, I give his definition of the latter: "In this genus the upper discoidal nervule of the forewing originates at the end of the discoidal cell, so that there is a very short upper disco-cellular nervule; the middle disco-cellular is upright and very slender; the lower disco-cellular obsolescent. In the hindwing the disco-cellular nervules are also very slender, the upper rather long; the second median nervule is given off opposite to the lower end of the cell. The apex of the forewing is rather rounded, the upper part of the outer margin being strongly rounded.. The markings of the underside are annular and exceedingly variable. The sex mark at the base of the hindwing of the male is a conspicuous tuft of black hairs on a dark ground. The hindwing of the female is less angled outwardly than in *Massaga*." (Journ. A. S. B., vol. lviii, pt. 2, p. (1889).

from the base beneath the cell (in some specimens encroaching within) to the exterior margin, within which is a row of more or less defined marginal and submarginal black spots, exterior margin defined by a black line, abdominal and anterior margins greyish-black, a tuft of fine greyish hairs near the base. *Thorax* above greenish-black; *abdomen* black; *antennæ* black, ringed with white; *head* and *palpi* above hoary; palpi and *thorax* beneath and *legs* white, tibiæ and tarsi with black spots. UNDERSIDE, *both wings* very pale ashy colour, covered with numerous transverse irregular-shaped black-bordered pale brown markings, those at the base short, a series across the disc zigzag, others along the exterior margin with narrow inner white lines, posterior angle of both wings with a black spot bordered above with orange-red. FEMALE. UPPERSIDE, *both wings* brownish-black. *Forewing* with a pale orange-yellow streak in the middle, above and beneath which are purple-blue connected streaks. *Hindwing* with ill-defined purple-blue marginal and discal spots, exterior margin defined by a very narrow yellow line, which is bordered within by a similar white line. *Cilia* in both sexes alternate brown and white." (*Moore*, l. c) The extent of the blue area of the upperside in the male is very variable in different Sikkim specimens. In one extreme the elongated black spot in the submedian interspace in the forewing is entirely absent, as are also the marginal and submarginal black spots on the hindwing. The underside of both wings in both sexes of Sikkim specimens varies much in the ground-colour, being in some specimens pale ochreous-white, in others ashy; the prominence of all the markings is also very variable. It occurs in Sikkim in October and November. I have received specimens also from Sibsagar in Upper Assam taken by Mr. S. E. Peal, from the Chittagong Hill Tracts taken by the late Mr. H. M. Parish in November, and one female from Tsenbo in Upper Burma taken by Major C. H. E. Adamson in May.

Mr. W. Doherty has given me the following description of the egg of *P. hewitsoni*:—"Egg a truncate pyramid, half again as long as wide, with two vertical, two sloping, and two horizontal faces, reticulate above as is usual in the *Lycænidæ*. It is the most remarkable egg known to me among Butterflies, and I was particularly anxious to examine other species to see whether this form was constant or not. But although seven species of *Poritia*, all very conspicuously coloured, are described from the Malay Peninsula, I have not obtained a single specimen of any of them during my stay here [in Perak] from the middle of May to the middle of November. The seven known species were mostly taken at Singapore, though that locality would seem to be very unfavourable for rare insects on account of the absence of virgin forest."

Mr. Doherty has described a variety (or better, local-race) of *P. hewitsoni* under the name of *tavoyana* chiefly on the coloration of the upperside of the female as follows:—"Taken commonly at Myitta, Tavoy. The males are remarkably variable, many are wholly indistinguishable from those of *P. phraatica*, Hewitson. I have taken every variation from those resembling Mr. Distant's figure of *P. phraatica* to those with an irregular blue area below the cell, wholly separate from a long submedian streak and a solid oblique subapical band. The underside varies greatly, and does not differ from that of *P. phraatica*. The female is pale blue over fully one-third of the forewing, and has more resemblance to the male than to the northern female with its small blue area. In the Tavoy form this extends from the cell to the hind margin projecting in the interno-median interspace within one-eighth of the outer margin; there is a blue spot in the cell, and a variable subapical band sometimes obsolete. The ochreous discal spot of the forewing is occasionally present. The blue area on the hindwing is variable but usually considerable." (*Doherty*, l. c.)

633. **Poritia pleurata,** Hewitson. (PLATE XXVI, FIG. 160 ♀).

P. pleurata, Hewitson, Trans. Ent. Soc. Lond., 1874, p. 346; idem, id., Ill. Diurn. Lep, p. 215, n. 3, pl. lxxxviii, figs. 3, 4, *male*; 5, *female* (1878); id., Distant, Rhop. Malay., p. 199, n. 3, pl. xxii, fig. 6, *male*; 5, *female* (1884).

HABITAT: Meplay Valley, Thoungyeen Forests (*Bingham*); Karen Hills (*Phayre Museum*, *Rangoon*); Singapore (*Hewitson*).

EXPANSE : ♂, 1·35 to 1·60 ; ♀, 1·20 (*Hewitson*), 1·6 inches.

DESCRIPTION : "MALE. UPPERSIDE, *both wings* brilliant blue. *Forewing* with the costal margin and apical half, which is marked by two blue spots, dark brown. *Hindwing* with the costal margin broadly brown ; the outer margin black, spotted with white. UNDERSIDE, *both wings* white, crossed everywhere by rufous bands and spots, and marked near the outer margin by a series of singularly-formed spots. *Forewing* with a black spot at the anal angle. *Hindwing* with three black spots ; the spot nearest the anal angle crowned with orange." (*Hewitson*, l. c. in Trans. Ent. Soc. Lond.) "FEMALE. UPPERSIDE, *both wings* cerulean-blue, clouded at the base. *Forewing* with the apical half dark brown, crossed by five pale blue spots. *Hindwing* with the costal and outer margins dark brown, the outer margin marked by two black spots crowned with blue." (*Hewitson*, l. c. in Ill. Diurn. Lep.)

In the Phayre Museum, Rangoon, is a pair of what I consider o be this species from the Karen Hills, Burma, the male taken in February, the female in April, and in my own collection are numerous others from the same locality taken from February to April. The males agree very fairly on the upperside with Hewitson's figure, but the two subapical blue spots (in my specimens there are from three to five) described on the forewing are not shown. In the figure referred to there is a small black streak in the submedian interspace of the forewing, which is lacking in most of my specimens. The hindwing is entirely blue except the costal margin, which is black, and the abdominal margin, which is whitish ; the outer margin is marked with a rather broad black line having a small irrorated indistinct black spot in each interspace within it, the cilia whitish. The shade of blue is a little lighter than in *P. hewitsoni*, Moore, but similarly changeable to brilliant emerald-green in some lights. The underside of the males of my specimens differs from that figured by Hewitson in that all the markings are rather less prominent. The female differs entirely from that sex of *P. hewitsoni*, being a blue insect with some black markings on the upperside, instead of a black insect with some blue and orange markings. My specimen agrees very fairly with Hewitson's figure of that sex, but is much larger, the blue coloration paler than in the male, but brighter than in Hewitson's figure. The hindwing has the outer margin black divided by a narrow lunular blue line, with a fine rufous line on the margin, defined on both sides by still finer black and blue lines, the rufous line defined by black continued on to the margin of the forewing. The underside agrees very closely with the figure of the underside of the male by Hewitson. I also possess two more males which probably belong to this species, both taken by Major C. T. Bingham, one in the Thoungyeen Forests in April, the other in the Meplay Valley in January. They both have a single subapical blue spot on the upperside of the forewing, and one specimen has a series of irrorated submarginal black spots on the hindwing in addition to the marginal series. The undersides of these specimens are variable, one is marked prominently with blackish, the other with ferruginous, the latter agrees very well with Hewitson's figure.

The figure shows both sides of a female example from the Karen Hills, Burma, now deposited in the Phayre Museum, Rangoon.

634. **Poritia phraatica**, Hewitson.

P. phraatica, Hewitson, Ill. Diurn. Lep., p. 214, n. 2, pl. lxxxviii, fig. 2, *female* (1878) ; id., Elwes and de Nicéville, Journ. A. S. B., vol. lv, pt. 2, p. 430, n. 102 (1886) ; id., Moore, Journ. Linn. Soc. Lond., Zoology, vol. xxi, p. 38 (1886); id., Distant, Rhop. Malay., p. 199, n. 2, pl. xxi, fig. 21, *male* ; pl. xxiv, fig. 8, *female* (1884) ; *P. pleurata*, Hewitson, Trans. Ent. Soc. Lond., 1874, p. 346 (*female* only).

HABITAT : Mergui, Ponsckai, Province Wellesley, Singapore.

EXPANSE : ♂, 1·1 to 1·4 ; ♀, 1·25 to 1·40 inches.

DESCRIPTION : "MALE. Allied to the male of *P. sumatræ*, Felder, but larger, and with the black area of the *forewing* on the UPPERSIDE smaller, its inner margin somewhat concavely occupying the end of the cell, after which it is more or less convexly continued to the first median nervule, and is then marginally continued to the angle, where there is a short black streak along the submedian nervure. UNDERSIDE, *both wings* with the markings closely resembling those of *P. sumatræ*, but much paler in hue." (*Distant*, l. c.) "FEMALE.

UPPERSIDE, *both wings* rufous-brown. *Forewing* with a large medial, oval, orange spot. *Hindwing* with a medial band and two submarginal spots orange, a marginal band of linear white spots. UNDERSIDE, *both wings* white, crossed by several bands of pale brown spots. *Forewing* with a black spot at the anal angle. *Hindwing* with three submarginal black spots, and an orange spot near the anal angle." (*Hewitson*, l. c. in Ill. Diurn. Lep.) "FEMALE. UPPERSIDE, *both wings* rufous-brown. *Forewing* with a large orange medial spot. *Hindwing* with an oblique medial band and three spots of orange near the outer margin, a submarginal linear band of white. UNDERSIDE, *both wings* like the male [of *P. pleurata*, Hewitson], but less crowded with spots." (*Hewitson*, l. c. in Trans. Ent. Soc. Lond.)

"A pair of this pretty species from Ponsekai, Tavoy, so named by Mr. Moore. The male does not at all agree with Distant's figure of this species. It seems near the *P. sumatræ*, Felder, but is quite distinct." (*Elwes* and *de Nicéville*, l. c.)

"Three males and one female were collected by Dr. Anderson in the Mergui Archipelago. The female is identical with Mr. Hewitson's type, figured as above. One of the males has a broad lower basal cobalt-blue patch with an outer lobe protruding towards the posterior angle [in the submedian interspace], and a partly confluent curved series of subapical spots; and the lower half of the hindwing has a similar-coloured patch with a marginal row of blackish oval spots. In the other male the blue is of a decidedly ultramarine tint, and the patch on the forewing has a medial black streak. The markings on the underside of the males are exactly like those on the female." (*Moore*, l. c.)

As pointed out above, *P. phraatica* seems to be as variable a species in the male as *P. hewitsoni*, Moore. The extent and distribution of the blue coloration is the same in both species on the upperside, but whereas in *P. hewitsoni* it changes from blue to emerald-green in some lights, in *P. phraatica* this is never the case.* The female differs considerably from *P. hewitsoni*, as it has no blue markings whatever on the upperside; the extent of the orange markings is very variable, in some examples occupying half the surface. Both sexes are smaller also. I give below Mr. Distant's description of the female, as he has not described the typical form.†

In the Indian Museum, Calcutta, are four males and two females of this species from Mergui and Tavoy.

To judge from the character of the markings of *P. sumatræ*, Felder, as figured, it belongs to this group. The male has a single broad green streak on the inner margin of the forewing on the upperside, cleft at its outer end; the lower three-quarters of the hindwing green, the remainder of both wings black. The female is pale violet-blue on the upperside with black margins, bearing two series of spots of the ground-colour on the forewing; the outer ends of all the veins marked with yellowish. The underside is marked with numerous closely-placed bands, less annular than in *P. hewitsoni* and allies. Its description is appended.‡

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* Since the above statement regarding tbe unchangability of the coloration of the upperside of the male was written, Mr. Doberty assures me that this character is not a constant one, but that in Tenasserim he found changeless blue and changeable blue to green males of *P. hewitsoni*, var. *tavoyana* flying together, and that they almost certainly represent one species. If this character breaks down, it appears that there is no other by which the males of *P. phraatica* can be distinguished from that sex of *P. hewitsoni*, Moore. Mr. Distant's figure of the male shews a green insect.

† "FEMALE UPPERSIDE, *both wings* bright ochraceous. *Forewing* with the costal, outer and inner margins broadly dark-brown. *Hindwing* with the basal half (notched posteriorly), a broad fascia occupying the margin from apex to the third median nervule, and then deflected transversely across the wing to a little above the anal angle, and three large conical marginal spots separated by the median nervules dark brown. UNDERSIDE, *both wings* as in the male, but much paler. The female specimen here figured is paler on the hindwing than depicted by Hewitson's figure, and is evidently a slight variety of the species."

‡ *Poritia sumatræ*, Felder. *Pseudodipsas sumatræ*, Felder, Reise Novara, Lep., vol. ii, p. 259, n. 306, pl. xxxvi, figs. 24. 25, *male*; 26, *female* (1865); *Poritia sumatræ*, Hewitson, Ill. Diurn. Lep., *Lycænidæ*, p. 218, n. 12 (1878); id., Butler, Trans. Linn. Soc. Lond., Zoology, second series, vol. i, p. 546, n. 1 (1877); id., Distant, Rhop. Malay., p. 198, n. 1, pl. xxii, fig. 2, *male*; 3, *female* (1884). HABITAT: Penang, Singapore, Sumatra. EXPANSE: *Male*, 1·25; *female*, 1·40 inches. DESCRIPTION: "MALE. UPPERSIDE, *both wings* pale greenisb-cyaneous, in certain positions vividly green. *Forewing* with more than the anterior two-thirds and an anal vittula fuscous. *Hindwing* with the costal border and the posterior margin before the cilia fuscous. UNDERSIDE, *both wings* hoary-brownish, with numerous ochraceous-fulvous markings circled with fuscous and arranged in fasciæ, and a submarginal series of rhombic spots paler than the ground, with fulvous pupils powdered with black. FEMALE. UPPERSIDE, *both wings* pale violaceous-cyaneous, with fulvous-fuscous vittulæ near the tips of the inferior nervules. *Forewing* with the costal and

635. **Poritia hartertii,** Doherty.

P. hartertii, Doherty, Journ., A. S. B, vol. lviii, pt. 2, p. (1889).

HABITAT: Upper Assam.

EXPANSE: ♂, 1·3 inches.

DESCRIPTION: "MALE. UPPERSIDE, *both wings* black, markings seen from above lustrous sea-green, from any other direction more or less bluish; the tips of the scales being blue and slightly tilted downwards. *Forewing* with six submarginal spots, the upper five small and subequal, arranged in a linear series; the lower slightly nearer the base, oblong and much longer than the others; a slender oblique fascia beyond the cell, divided by the discoidal nervules into three parts, the lowest longest; a stripe along the lower side of the median nervure extending to the base, a small part of it lying beyond the first median nervule, which divides it; beyond this a wide transverse discal spot, divided by the second median nervule into two portions outwardly dehiscent; another stripe along the hind margin almost from the base, the outer end inclined upwards, with a minute spot above its termination, separated from it by the submedian nervure. *Hindwing* with a large pale costal area, a tuft of long hairs appressed in the direction of the apex placed on a gland which forms a raised elliptical line on the underside above the origin of the first subcostal nervule; four submarginal spots, a diffused one extending from the median nervure half-way to the submedian nervure; a large obliquely-semicircular one dark in the middle in the first median interspace, a narrow crescent close to the marginal black line in the third median interspace, and a small diffused spot in the next interspace, partly united with the upper discal spot; three discal spots, one occupying the submedian interspace from its base, constricted in the middle, the end clavate and occupying the whole breadth of the interspace, beyond this two spots of moderate size in the median interspaces discally. UNDERSIDE, *both wings* rufous-brown with a slight bluish gloss. *Forewing* with a broad white band beyond the cell from the costa (where it is narrowest) almost to the hind margin; beyond it a broad space of darker richer brown, then a row of seven delicate whitish transverse submarginal streaks, of which the upper three are most distinct, crescent-shaped; the others obscure and irregular; beyond these a paler space, with three whitish streaks, parallel with and close to the upper three of the inner series; margin chestnut-brown; *cilia* chiefly light. *Hindwing*, basal part unmarked, a broad white band crossing the wing from the costa, occupying the outer third of the cell, its inner margin well-defined, and but slightly irregular; the disc is covered with large rufous-brown markings in two very irregular series; the first four (those above the discoidal nervule) on a white ground, the others on a ground obscurely clouded with violet and whitish scales; two of these spots in the inner series and the median interspaces are much larger than the others, the outer one quadrate; a dark wavy outer discal line extends in a white ground to the third median nervule, where it is interrupted, and from there to the anal angle on a whitish ground; marginal line orange-brown, bordered inwardly by a silvery line, between which and the wavy discal line are, in the second median interspace, a blackish area, in the first median

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terminal border fuscous, this divided by two macular fasciæ of the ground-colour (the interior much shorter), and with a disco-cellular litura fulvous-reddish circled with blackish. *Hindwing* with the interior border palely fuscous, the external margin broadly fuscous, divided by lunules and an anteciliary streak of the ground-colour. UNDERSIDE, *both wings* as in the male, but the submarginal spots inwardly triangular."

"In many respects a very distinct species. The head is small, the eyes naked, the antennæ gradually clavated, the subcostal nervure of the forewing only two-branched, and the costal nervure of the hindwing short. The male has on the upperside of the hindwing along the cell-fold a tuft of fine hairs, and shows on the underside of the forewing, on the lower side of the median nervure, a shining spot thinly covered with scales. The costal margin of the hindwing is in this sex, towards the base, widened out raggedly. (*Felder*, l. c.)

Poritia sumatræ, var.? Distant, Rhop. Malay., p. 198, pl. xx, fig. 12, *female* (1884). HABITAT: Malacca. EXPANSE: *Female*, 1·5 inches. "This figure represents the female specimen collected by Capt. Pinwill and contained in the British Museum, which has been identified by Mr. Butler as belonging to Felder's species. The differences, however, between that author's figure and the specimen thus identified are so considerable that it is probable that the female of another species has been confused with that of Felder." (*Distant*, l. c.) The differences between these two figures are chiefly as follows:—In Felder's the ground-colour is much deeper blue, in Distant's it is pale violet; Distant's figure does not show the outer portions of all the veins bearing fulvous-fuscous streaks, this being a conspicuous feature in Felder's specimen; and on the underside the markings of Distant's specimen are wider, apparently fewer, and much less distinct than those shewn on the underside of Felder's male specimen; the only difference that Felder gives in the markings of the underside of both sexes is that in the female the submarginal spots are inwardly triangular. If Mr. Distant had fully described his specimen it would have been easier to judge whether it represented a species distinct from *P. sumatræ* or not.

interspace a grey area, and thence to the anal angle a blackish line, inwardly bordered with reddish; *cilia* basally grey, outwardly dark."

"From *P. phalena*, Hewitson, from Singapore, of which it seems to be the northern representative,* it differs in the narrow streak below the cell in the forewing, with the bifid spot beyond it, and in the long mark in the hind margin. The hindwing below is quite different, much less white, the discal spots larger and of the general ground-colour, the submarginal spots absent, and the apical rufous-brown space greatly reduced."

"The generic characters resemble those of *P. hewitsoni*, Moore. The left forewing has the first subcostal nervule rather more slender and further from the base of the second than in that species. In the right forewing the first subcostal nervule is wholly absent. This interesting aberration may be of frequent occurrence in this group, and may have been the cause that Moore, Hewitson, Felder and Distant passed over this vein in their descriptions of the genus."

"The egg probably agrees with that of the other species of the subfamily. It is a truncate pyramid nearly twice as long as wide, with two vertical and two sloping sides, the former trapezoidal, reticulate near their upper edges; the latter and the apex nearly square, delicately reticulate. In the ovarian tubes of the female, these eggs are found in pairs, attached by their bases. Along with those of *Liphyra brassolis*, Westwood, they are the most remarkable eggs in the family."

"The chrysalis somewhat resembles those of the *Erycinidæ* [= *Nemeobiinæ*] and strikingly illustrates the singularity of the group. It is suspended, not girt, but rigidly inclined towards the surface of the leaf. It is less compact in form than that of other *Lycænidæ*, and is studded with bristles. Of these a number on the side of the head are white, with two black ones on each side of the top of the head, and one black one on each side of the thorax above the thoracic angle. The second, third, and fourth abdominal segments have each a lower white and an upper black bristle approximate laterally; while the last segments have a number of white lateral and of black subdorsal ones. The ground-colour is ochreous, much marked with dark, especially on the upper surface of the abdomen; each segment having a black line near its hind margin, except the first which has two distinct black spots dorsally. The wing-covers are veined and bordered with brown."

"I name this species for my fellow traveller in Assam, Lieutenant Ernst Hartert, the ornithologist and African traveller, who obtained the sole specimen." (*Doherty*, l. c.)

636. **Poritia potina**, Hewitson.

P. potina, Hewitson, Trans. Ent. Soc. Lond., 1874, p. 347; idem, id., Ill. Diurn. Lep., p. 215, n. 4, pl. lxxxviii, figs. 6, 7, *female* (1878); id., Distant, Rhop. Malay., p. 201, n. 7, pl. xxii, fig. 7, *female* (1884); *Massaga potina*, Doherty, Journ. A. S. B., vol. lviii, pt. 2, p. (1889); *Simiskina potina*, Staudinger, Ex. Schmett., p. 275, pl. xcv, *female* (nec *male*) (1888); *Simiskina fulgens*, Distant, Entomologist, vol. xix, p. 12 (1886); idem, id., Rhop. Malay., p. 450, n. 1, pl. xlii, fig. 3, *female* (1886).

HABITAT: Tavoy, Perak, Penang, Malacca, Singapore.

EXPANSE: ♂, 1·3; ♀, 1·4 to 1·6 inches.

DESCRIPTION: "MALE. UPPERSIDE, *both wings* velvety black, with the following rich blue markings varying according to the light:—one below the cell, clavate, extending widely into the [bases of the] median interspaces; one below the submedian nervure, with a spot above the end of it; a series of three spots a little beyond the end of the cell, the upper obscure, the lowest quadrate; a submarginal series of six spots, the lowest large and cordate. *Hindwing* with a

* *Poritia phalena*, Hewitson, Trans. Ent. Soc. Lond., 1874, p. 344; idem, id., Ill. Diurn. Lep., p. 216 n. 8, pl. lxxxix, figs. 14, 15, *male* (1878); id., Distant, Rhop. Malay., p. 200, n. 4, pl. xxii, fig. 8, *male* (1884). HABITAT: Singapore. EXPANSE: *Male*, 1·4 inches. DESCRIPTION: "MALE. UPPERSIDE, *both wings* black, marked by bands and spots of green. *Forewing* with a longitudinal narrow band from the base to the middle a band [bifid spot] on the inner margin, a trifid spot near the costal margin, and a submarginal series of six spots. *Hindwing* with a band near the inner margin, two submarginal spots, and three spots on the outer margin; one of them, which is at the anal angle, large, and marked by a black spot. UNDERSIDE, *both wings* rufous-brown. *Forewing* crossed at the middle by a band of white, and beyond it by a series of five grey spots. *Hindwing* white, with the base and apex rufous-brown; several small brown spots near the middle, followed by three larger spots of the same colour; four large marginal spots, their centres and borders black." (*Hewitson*, l. c., in Trans. Ent. Soc. Lond.)

This species must be very rare, none seem to have been obtained since Mr. Wallace procured the type.

longitudinal mark in the interno-median interspace, from the base two-thirds to the outer margin; two discal spots in the next two interspaces; three marginal crescents in these three interspaces, the subanal one large, with a streak alongside of it beyond the submedian nervure. UNDERSIDE, *both wings* rufous-brown, brighter than in *P. pediada*, Hewitson. *Forewing* with an obscure darker rufous streak across the end of the cell, a darker rufous line across the disc as far as the first median nervule, bordered outwardly by a darker bluish-tinged space, an outer-discal obscure lunular line bordered inwardly by a paler bluish line, and outwardly by a broad pale space, which is conspicuous and somewhat ochreous near the apex; inner margin and interno-median interspace chiefly dull ochreous, shining; a bright reddish marginal line; *cilia* blackish. *Hindwing* with the base and costa dark rufous-brown, the rest paler rufous; a brighter rufous streak closing the cell; a similar discal series of lunules irregularly placed, an obscure dark outer-discal lunular line, obsolete subapically, bordered both inwardly and outwardly by a paler bluish space, and then by a brighter rufous space; a bright rufous marginal line bordered subanally by slender black and white lines; *cilia* dark." (*Doherty*, l. c.) "FEMALE. UPPERSIDE, *both wings* orange. *Forewing* with the apex, the outer and inner margins, and a linear spot at the end of the cell, dark brown. *Hindwing* angular a little below the apex [at the termination of the third median nervule], clouded with rufous-brown, and marked by three large brown spots near the outer margin. UNDERSIDE, *both wings* rufous, tinted with lilac, a linear spot at the end of the cell; crossed before the middle by a rufous-brown band (broken into spots on the hindwing), crossed beyond the middle by two bands (near together) of the same colour." (*Hewitson*, l. c. in Trans. Ent. Soc. Lond.)

"One male and five females (only one fresh) taken near Myitta, in the Tavoy district. The male differs from the male of *M.* [= *P.*] *pediada*, Hewitson, in having the markings [on the upperside] larger, clearer, and not bluish-green, but blue [in all lights]. The underside is less dark and uniform. Both sexes are more falcate than in *M. pediada*, and of larger size. The female generally sits on a leaf with half-open wings, and might easily be taken for a small *Cirrhochroa* or sometimes for a *Loxura*. In any case its entire departure from the usual colours of the group indicate that it is likely to prove a mimic. The female is somewhat variable. I have no doubt that it will turn out to be conspecific with *P. potina*, from the Malay Peninsula, which I only know by Hewitson's figure It seems also probable that the species named by Mr. Distant *Simiskina fulgens*, and placed by him in the *Erycinidæ* [= *Nemeobiinæ*] is identical with or at least very closely allied to this species. Unfortunately he gives no description of the genus, merely noting two particulars in which, it is true, it differs from all Eastern *Erycinidæ*, but agrees with the *Poritias* and most other genera of the *Lycænidæ*. His figure faithfully represents a rather worn and faded example of this species."

"The egg of *M. potina* differs from that of *Poritia* in having the hexagonal reticulations very regular and delicate; it has the same extraordinary shape. It differs wholly from the eggs of the Eastern *Erycinidæ* which are all round in horizontal section and without the slightest trace of reticulation." (*Doherty*, l. c.)

I give below Messrs. Distant and Doherty's descriptions of the female of this species.*

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* FEMALE. "UPPERSIDE, *both wings* bright ochraceous. *Forewing* with the apex, the outer and inner margins, broadly dark brownish, with a narrow linear disco-cellular spot of the same colour. *Hindwing* with the cellular area, the whole area between the cell, the third median nervule. and the abdominal margin, and a broad outer macular margin, dark brownish. UNDERSIDE, *both wings* pale ochraceous, with linear pale castaneous disco-cellular spots, a much-waved castaneous fascia crossing the wings beyond the cells, recurved, and terminating on the abdominal margin of the hindwing; two fainter outer discal fasciæ, the outermost of which is blackened on the hindwing. *Hindwing* with the outer margin pale castaneous, preceded by two dark linear fasciæ. *Body* above fuscous, beneath more or less concolorous with the wings." (*Distant*, l. c.)

"FEMALE. UPPERSIDE, *both wings* bright orange-tawny, the apex and outer margin (not the costa) widely blackish; the ends of the three median nervules and the submedian nervure brown or even orange, the orange area almost semicircular outwardly; the inner margin and the basal half of the interno-median interspace is usually more or less irrorated with black scales, which also enter the base of the discoidal cell; a marginal rufous line; *cilia* darker. *Hindwing* orange, generally strongly irrorated with black, the veins less so; an obscure submarginal band of darker quadrate spots; a rufous marginal line; some specimens have almost the whole upper surface orange except the apex and outer margin of the forewing; *cilia* darker. UNDERSIDE, *both wings* light rufous-brown, much paler than in the male, the markings darker ferruginous, resembling those of the male, but more distinct." (*Doherty*, l. c.)

In 1886, Mr. Doherty described this species in MS. from a male specimen from the town of Thaiping, 1,000 feet elevation, Perak, under the name of *Massaga clorinda*. He gave the following structural details of the

637. **Poritia pediada,** Hewitson.

P. pediada, Hewitson, Ent. Month. Mag., vol. xiii, p. 223 (1877); idem. id., Ill. Diurn. Lep., p. 218, n. 11, pl. lxxxix, figs. 21, 22, *female* (1878); id., Distant, Rhop. Malay., p. 200, n. 6, pl. xxii, fig. 16, *female* (1884); *Massaga pediada*, Doherty, Journ. A. S. B., vol. lviii, pt. 2, p. (1889).

HABITAT: Mergui, Singapore.

EXPANSE: ♂, 1·2; ♀, 1·1 to 1·5 inches.

DESCRIPTION: "MALE. UPPERSIDE, *both wings* velvety black. *Forewing* with the following rich bluish-green markings, varying according to the light:—one below the cell, clavate; one basal, below the submedian nervure, its terminal part crossing the nervure; one a little beyond the cell, oblique, consisting of three quadrate spots; a submarginal row of six spots, the last larger, subcordate. *Hindwing* with a longitudinal mark in the internomedian interspace from the base united terminally with the inner of a row of three triangular spots crossing the disc; three submarginal spots in the same spaces as the discal spots, the middle spot small, lunular, the two outer spots semi-circular, enclosing black spots, the subanal one largest. UNDERSIDE, *both wings* dull rufous-brown with a pale violet gloss. *Forewing* with a broken macular line of minute whitish spots across the disc, an outer-discal line of small and very obscure pale lunules, beyond which lies a pale band, the margin brighter rufous. *Hindwing* with the base and costa dull rufous-brown, most of the rest irrorated with whitish scales, an obscure darker transverse [discal] line with two sagittate marks in the median interspaces, a submarginal dark zigzag line bordered inwardly by a pale line; a marginal bright reddish line bordered inwardly by slender black and white lines which do not extend to the apex." (*Doherty*, l. c.) "FEMALE. UPPERSIDE, *both wings* dark brown, slightly tinted with dull blue. *Hindwing* with the outer margin dentate near the middle, traversed from the dentation to the anal angle by a pale blue line. UNDERSIDE, *both wings* red-brown, crossed transversely by two bands of lilac-white, one near the middle, the other snbmarginal. *Hindwing* with a short band of the same colour between the others, and a submarginal line of white." (*Hewitson*, l. c. in Ill. Diurn. Lep.)

Mr. Doherty obtained a pair of specimens of this species at Mergui, Burma, in the cold weather. The female differs from Hewitson's type specimen in lacking on the upperside of the hindwing the pale blue line from the dentation to the anal angle, and the underside of the Mergui specimen can hardly be said to be traversed by two bands of lilac-white. The species, however, is probably variable. I append as a foot-note Mr. Doherty's description of his female specimen.* The disposition of the markings of the males on the upperside in *Poritia* (*? Zarona*) *pharyge*, *P. hartertii*, *P. phalena*, *P. potina*, *P. pediada*, and *P. phalia* (Hewitson, from Borneo), is practically the same, and is quite different from that of the other species of the genus.

P. pheretia, Hewitson, from Singapore, certainly belongs to this group. The male on the upperside of the forewing has two pale blue broad streaks from the base, the upper one apparently confined to the discoidal cell, the lower one on the inner margin, with a clavate outer end; four discal spots. Hindwing with the outer two-thirds pale blue, bearing a single blackish dot about the first median interspace. The female is brown on the upperside, the anal third of the wing lilac-white. The underside is marked much as in *P. phalena*, Hewitson, but the white band is much narrower. Its description is appended.†

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specimen:—"PREHENSORES, seen from the side. *Uncus* quadrate, the upper angle projecting, rather acute, the lower rounded, retreating; branches long, slender, tapering, not hooked. *Clasps* with a basal tubercle on the upper edge, the end enlarged and bilobed, resembling a pair of pincers, the upper thickened beyond the base, bent down to meet the other, but with the tip recurved upwards, the lower lobe regularly curved, tapering, acute. The upper discoidal nervule of the forewing originates from the subcostal nervure some distance beyond the apex of the discoidal cell."

* "FEMALE. UPPERSIDE, *both wings* blackish, the costa paler; *cilia* paler. UNDERSIDE, *both wings* rufous-brown, much lighter than in the male, a darker rufous streak across the end of the cell of both wings; a similar slender transverse discal fascia, continuous on the forewing, broken and lunular on the hindwing: a darker outer-discal line, obscure on the forewing, blackish subanally on the hindwing, placed in a paler band beyond a darker rufous band. *Forewing* with the margin brighter rufous. *Hindwing* with some submarginal blackish scales near the anal angle, and a brighter rufous marginal line bordered inwardly by slender black and white lines subanally." (*Doherty*, l. c.)

† *Poretia pheretia*, Hewitson, Trans Ent. Soc. Lond., 1874, p. 346; idem, id., Ill. Diurn. Lep., p. 217, n. 9, *P. pheretria*, pl. lxxxix, figs. 17, 18, *male*; 16, *female* (1878); id., Distant, Rhop. Malay., p. 200,

Genus 101.—PSEUDODIPSAS, Felder.

Pseudodipsas, Felder, Wien. Ent. Monatsch., vol. iv, p. 243 (1860).

"*Eyes* naked. *Antennæ* indistinctly ringed, with a very slender, very lengthened, and rather straight club. *Palpi* scaly, scarcely hairy; the second joint half the length of the head in the male, thrice as long in the female; the third joint needle-like, about half the length of the second. FOREWING, with a four-branched subcostal nervure, the third branch emitted from the fourth nearly half way from its base and the apex."

"In the shape of the wings this very delicate species [the type species is *Thecla* (*Pseudodipsas*) *eone*, Felder, from the Aru Islands] reminds one of *Dipsas* [*Pseudodipsas*] *lycænoides*, Felder [from Amboina]; in the form of the head and antennæ it comes near to the group of *Thecla polycletus*, Linnæus, *epicletus*, Felder, *apelles*, Fabricius (section *Hypochrysops*, Felder)." (*Felder*, l. c.)

Dr. Felder placed a single species in this genus when describing it; to this he added, in the "Reise Novara," three others from the Malay Archipelago. Two of these species, *P. sumatræ* and *P. erycinoides*, are true *Poritias*; the third, *P. lycænoides*, from Amboina, is a very curious species, in which the hindwing has two short but well-formed tails, and the markings of the underside remind one of species of the genus *Lampides*, Hübner. Hewitson says that this species belongs to the genus *Lycænesthes*, Moore, but the tails look to me to be too substantial to bring it into that genus. Hewitson goes so far as to say that *P. lycænoides* equals *L. bengalensis*, Moore (=*L. emolus*, Godart), but I think in this he is wrong. Messrs. Hewitson and Miskin have added two more species to *Pseudodipsas* from Australia, while the former described a single species from "India," which is my sole authority for including the genus in this work. *Pseudodipsas* is known to me by figures and descriptions only; I have seen no specimen of it. It appears to be closely allied to *Poritia*, Moore, and is said by Hewitson to have three subcostal nervules to the forewing.

638. Pseudodipsas cephenes, Hewitson.

P. cephenes, Hewitson, Trans. Ent. Soc. Lond., 1874, p. 344; idem, id., Ill. Diurn. Lep., p. 219, n. 3, pl. lxxxix, figs. 3, 4, *female* (1878).

HABITAT: India (*Hewitson*).

EXPANSE: ♀, 1·2 inches.

DESCRIPTION: FEMALE. "UPPERSIDE, *both wings* dark brown. *Hindwing* with a submarginal series of five black pyramidal spots, bordered with white. UNDERSIDE, *both wings* white, with four or five spots before the middle, both wings crossed beyond the middle by a broad band, all [the markings] slightly darker than the rest of the wing, and bordered with brown. *Forewing* with two submarginal bands of lunular brown spots. *Hindwing* with a minute black spot near the base, and a submarginal series of pyramidal spots; the anal angle and a spot near it, where the outer margin projects, black, crowned with orange." (*Hewitson*, l. c. in Trans. Ent. Soc. Lond.)

From the figures given this is a very plainly coloured and plainly marked species. The upperside is fuliginous, forewing unmarked, hindwing with a prominent anteciliary white line and a series of five submarginal prominent white lunules, their points resting on the anteciliary line, and enclosing black spots. All the markings of the underside are much blurred. It is probable that this species came from Burma, as the late Mr. W. S. Atkinson's collection (from whom Mr. Hewitson obtained the specimen he described) contained many species from that region.

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n. 5, pl. xxii, figs. 9, *male*; 10, *female* (1884). HABITAT: Singapore. EXPANSE: *Male* and *female*, 1·1 to 1·2 inches. DESCRIPTION: "MALE. UPPERSIDE, *forewing* black, with a band from the base to the middle, a band on the inner margin, and a transverse band of four spots beyond the middle, all green-blue. *Hindwing* green-blue, with the costal margin and a spot below the middle dark brown. UNDERSIDE, *both wings* rufous, pale. *Forewing* crossed at the middle by a band of white. *Hindwing* irrorated with white at the middle, and crossed by a band of brown spots; three large spots on the outer margin; the two largest at the anal angle, white bordered with black, the middle spot marked with black, the outer spot black. FEMALE. UPPERSIDE, *both wings* rufous-brown. *Hindwing* with the outer half nearly lilac-white. UNDERSIDE like the male, except that the *forewing* is crossed by a second band of white." (*Hewitson*, l. c. in Ill. Diurn. Lep.)

This is another species originally obtained by Mr. A. R. Wallace, which has not apparently been captured since.

The third division I have made in the Indian *Lycænidæ* I have called the *Lycæna* group. Superficially at any rate it is a well-marked one, and contains a considerable assemblage of genera, none of which (except some specimens of the genus *Megisba*, Moore, and the genus *Lycænesthes*, Moore) are furnished with a distinct tail to the hindwing. The two last genera of the group are certainly aberrant; they are much more strongly built than any of the others, have more robust bodies, thicker wings, and, instead of a slow jerky weak flight, are very strong and swift on the wing. These two genera (*Lycænesthes* and *Niphanda*, both described by Moore), are obviously closely allied, indeed Distant considers them to be one genus, but I think it well to keep them distinct, as *Lycænesthes* has three small ciliated tails to the hindwing (a unique feature in the *Lycænidæ*, as far as I know), which *Niphanda* entirely lack. The coloration and markings of the two genera also differ considerably. The *Lycæna* group is obviously very closely allied to the next, which I call the *Polyommatus* group, and the two together comprise the true "Blues." The genus *Megisba*, Moore, of the *Lycæna* group, is aberrant, as noted above, as some species, or forms, or individuals, have a single delicate short filamentous tail. There is considerable variation in the neuration of the group; one genus having two subcostal nervules to the forewing, and the rest three. In three genera, *Pithecops*, Horsfield, *Azanus*, Moore, and *Orthomiella*, mihi, the first subcostal nervule is entirely anastomosed with the costal nervure for a part of its length, in *Pithecops* not again freeing itself, but in *Azanus* and *Orthomiella* its apical portion again becomes free and reaches the costa. Speaking broadly, the first six genera of the group are blackish on the upperside of both wings, the other eight are of some shade of blue or purple in the male, often blackish in the female. All the genera of the *Lycæna* group lack secondary sexual characters in the male.

In the first subgroup I place four genera, *Pithecops*, Horsfield, *Neopithecops*, Distant, *Spalgis*, Moore, and *Taraka*, Doherty MS. Mr. Doherty writes (Journ. A. S. B., vol. lviii, pt. 2, p. 1889) that the *Lycæninæ*, which comprises my *Lycæna* and *Polyommatus* groups "are distinguished by their decidedly concave eggs, broadest above the middle, the reticulations often irregular, and vary greatly on different parts of the surface. Those on the sides consist of small white knobs constricted at the base, from which spring either four of six elevated lines, forming quadrangles or triangles. In *Catapœcilma*, Butler [I place this genus in the *Horaga* group, owing to its possessing three short tails, the middle one the longest, to the hindwing] the spaces are hexagonal, and in *Semanga*, Distant [a Malayan genus allied to *Catapœcilma*] irregular; I include these genera here with much doubt. The typical *Lycæna* group, containing the great majority of the subfamily, have hairy eyes (the hairs few and scattered in *Castalius*, Hübner, and *Zizera*, Moore). The *Pithecops* group consists of naked-eyed genera, of which the eggs of *Megisba*, Moore, and *Pithecops*, Horsfield, have tetragonal spaces, and *Neopithecops*, Distant, triangular spaces." As far as the imago goes, I should hardly have thought that *Megisba* could be morphologically allied to what I call the *Pithecops* subgroup, as in the imago it differs widely in structure, appearance, and habits from the genera *Pithecops* and *Neopithecops* with which Mr. Doherty associates it.

Genus 102.—PITHECOPS, Horsfield. (PLATE XXVI).

Pithecops, Horsfield, Cat. Lep. E. I. C., p. 66 (1828).

FOREWING, elongated, narrow; *costa* regularly arched throughout, *apex* rounded, *outer margin* very convex, *inner angle* rounded, *inner margin* slightly sinuous; *costal nervure* short, terminating before the apex of the discoidal cell; *first subcostal nervule* emitted at about the middle of the cell, very short, directed obliquely upwards to the costal nervure, with which it is completely anastomosed in its entire length except a short portion of the base; *second* subcostal long, emitted nearer to the base of the first than to the base of the upper discoidal nervule; *third* subcostal very short, emitted from the costal nervure at about opposite the apex of the second subcostal; *discoidal cell* long, narrow, extending to the middle of the wing; *upper disco-cellular nervule* wanting, *middle* and *lower* disco-cellulars of about equal length, concave; *lower discoidal* nervule from the point of junction of the disco-cellulars; *second*

median nervule emitted some little distance before the lower end of the cell; *submedian nervure* sinuous, following the shape of the inner margin. HINDWING, elongated, oval; *costa* very straight, *outer* and *abdominal* margins sweeping round in an even curve; *costal nervure* not much arched at base, then straight, reaching the apex of the wing; *first subcostal nervule* emitted far before the apex of the cell; *upper disco-cellular* nervule short, outwardly oblique, straight, *lower* disco-cellular longer, upright, concave; *second median* nervule emitted some short distance before the lower end of the cell. *Antennæ* with a well-formed, spatulate club. *Eyes* naked. *Body* long.

Pithecops contains but two described species in the Indian region, one of which (*P. hylax*, Fabricius) occurs in Sikkim, the Chittagong Hill Tracts, Sandoway, Arakan, Bassein, Burma, Province Wellesley, Perak, Nias Island, Sumatra, Java, Borneo, and Celebes. Its coloration is brownish-black on the upperside. The other species, *P. fulgens*, Doherty, has been found in Upper Assam only; the male has a patch of brilliant iridescent blue on each wing on the disc and base above; the female is coloured like *P. hylax*. Both sexes of *P. hylax* and the female of *P. fulgens* are very similar in appearance to *Neopithecops zalmora*, Butler, but an examination of their structure shews that they differ considerably in the shape of the forewing, and also in neuration, from any species of that genus. The underside of both species of *Pithecops* is white, the forewing with two small brown spots on the middle of the costa, and some brown and black marginal markings; the hindwing with a very large round black spot at the apex, marginal markings as in the forewing. The transformations of *P. hylax* are described under that species. Herr J. Röber (Iris, vol. i, p. 61, pl. iv, fig. 26 (1886) appears to have described a new species of *Pithecops* from Eastern Celebes under the name of *Plebeius phönix*; it is figured in Dr. Staudinger's "Exotische Schmetterlinge." These are all the species known to me of the genus, which appears to be strictly confined to the Indo-Malayan region. I am unable to identify the "*Polyommatus*" *hylax*, figured in Donovan's "Insects of India," pl. xlvi., fig. 2, and referred by Kirby in his "Synonymic Catalogue," p. 346 (1871) to this genus as *Pithecops donovani*.

Key to the Indian species of Pithecops.

A. Both sexes, upperside, both wings deep blackish-brown.
    639. P. HYLAX, Sikkim, Burma, Malay Peninsula and Archipelago.
B. Male, upperside, both wings with the disc resplendent cyaneous-blue; female, upperside, both wings blackish.
    640. P. FULGENS, Upper Assam.

639. **Pithecops hylax**, Fabricius. (PLATE XXVI, FIG. 161.)

Papilio hylax, Fabricius, Syst. Ent., p. 526, n. 351 (1775); idem, id., Sp. Ins., vol. ii, p. 124, n. 559 (1781); idem, id., Mant. Ins., vol. ii, p. 77, n. 709 (1787); *Hesperia Rurales hylax*, id., Ent. Syst., vol. iii, pt. 1, p. 304, n. 152 (1793); *Polyommatus hylax*, Godart, Enc. Méth., vol. ix, p. 701, n. 241 (1823); *Pithecops hylax*, Horsfield, Cat. Lep. E. I. C., p. 66, n. 1, pl. i, figs. 2, 2*a*, *imago*; 2*b*, *pupa* (1828); id., Moore, Proc. Zool. Soc. Lond., 1865, p. 771; id., Butler, Cat. Fab. Lep. B. M., p. 161, n. 1 (1869); id., de Nicéville, Journ A. S. B., vol. li, pt. 2, p. 61, n. 167 (1882); *Lycæna hylax*, Hopffer, Stett. Ent. Zeit., vol. xxxv, p. 27, n. 50 (1874); id., Staudinger, Ex. Schmett., p. 271, pl. xciv, *male* (1888).

HABITAT: Sikkim, Chittagong Hill Tracts, Sandoway, Arakan, Bassein, Burma, Province Wellesley, Perak, Nias Island, Sumatra, Java, Borneo, Celebes.

EXPANSE: ♂ ♀, ·95 to 1·1 inches.

DESCRIPTION: "MALE. UPPERSIDE, *both wings* deep blackish-brown, the colour being uniformly spread over the whole surface to the border of the hindwing which is silvery-white. [*Forewing* with an oval patch of paler brown on the middle of the disc.] A very delicate gray *cilia* interrupted with brown bounds the forewing. UNDERSIDE, *both wings* white with a greyish-silvery gloss inclining to blue, and the scales covering their surface large and rough; sometimes beyond the disc both wings are traversed by a delicate, undulated, interrupted striga of reddish-brown, exterior of this by a broader continued fascia of the same colour, undulated at its outer edge; next follows an interrupted series of oblong [black] spots, and finally a regular narrow marginal line of intense black, exterior to which the

wings are bounded by a silvery *cilia*. *Forewing* marked near the costa with two small irregular dots of an intense black. *Hindwing* at the posterior angle [apex] with a large regularly circumscribed spot of the same colour, a minute dot is in some individuals obscurely perceptible near the anal angle. *Legs* covered with lax villi of silvery-white, *tarsi* surrounded by a black ring. *Body* brown above and white underneath. *Eyes* uncommonly prominent, and bordered with white. *Antennæ* brown, annulated with white. FEMALE. Wings somewhat broader. UPPERSIDE, *forewing*, disc marked with a rhomboidal white patch, more intensely coloured exteriorly." (*Horsfield*, l. c.) I am nearly sure Horsfield has mistaken a *Neopithecops* for the female of his *Pithecops hylax*, the markings of both sexes of the latter being alike.

Dr. Horsfield notes that the LARVA in Java feeds on a leguminous plant. The PUPA as figured by him is very short and thick, pale ochreous-brown marked with dark brown, and as delineated these markings on the thorax assume the appearance of the face of a monkey, eyes, nose, nostrils and mouth. Dr. Horsfield states that he has "given the name of *Pithecops** from the peculiar aspect of the chrysalis."

Occurs in Sikkim in March and October. It is found in heavy forest only, and has a weak fluttering flight, settling on the leaves of shrubs and plants. As has been noted in the habitat above, this species has a very wide range. Except Sikkim, Nias Island and Java, Mr. Doherty is responsible for all the other localities, in which he has personally met with it.

The figure shews both sides of an example from Sikkim in my collection.

640. **Pithecops fulgens**, Doherty.

P. fulgens, Doherty, J. A. S. B., vol. lviii, pt. 2, p. (1889).

HABITAT: Margherita, Upper Assam.

EXPANSE: ♂ ♀, 1·0 to 1·1 inches.

DESCRIPTION: "MALE. UPPERSIDE, *both wings* black. *Forewing* with the discoidal cell, the interno-median interspace, and the disc of the lower discoidal interspace, resplendent cyaneous blue in some lights, dull violet in others, the black border wide, extending one-third towards the base. *Hindwing* similarly blue from the lower subcostal nervule to the submedian nervure, the black border somewhat narrower, especially towards the anal angle; *cilia* of the hindwing whitish, except at the ends of the veins. UNDERSIDE, *both wings* pure white; a very slender dark marginal line, a narrow submarginal white band containing a line of six minute dark transverse streaks in the forewing and five [usually six] in the hindwing, within which is a narrow transverse ochreous-brown fascia very clearly defined (in the hindwing by an obscure dark line on its inner border), extending across the whole breadth of the forewing, and on the hindwing from the first subcostal nervule to the submedian nervure; traces of slender discal streaks in the forewing near the lower angle within the ochreous band. *Forewing* with the apex obscured with black scales; [two small costal black spots]. *Hindwing* with a large and conspicuous subapical black spot extending from the costa to the lower subcostal nervule. FEMALE. UPPERSIDE, *both wings* blackish. *Forewing* with the costa and outer margin darker; *cilia* of the forewing pale, of the hindwing white. UNDERSIDE, *both wings* as in the male."

"Margherita, where it perhaps takes the place of *P. hylax*, Fabricius. According to Mr de Nicéville that species is in Sikkim much commoner than *Neopithecops*, which I did not see in Assam at all. But in the Chittagong Hill Tracts, at Sandoway and Bassein in Burma, and in the Malay Peninsula, *Pithecops* is the rarer form. In Java it is *Neopithecops* that is rare, another instance of its close faunal resemblance to the Himalayas. In Celebes I did not observe any *Neopithecops*, but a large protected *Pithecops* (*P. phœnix*, Röber)† is very common and conspicuous. On the other hand, *Neopithecops* seems to occur alone in Malabar (where I found it as far north as the Gersapa Falls in North Kanara), and Ceylon, and also as far as my experience goes, in the islands of Lombok, Sambawa and Sumba east of Java."

"The genera differ in many important points. As regards prehensores, the clasp (harpago) of *Neopithecops*, seen from the side, is simply clavate at the tip, while that of *Pithecops* is long

* PITHECIUM, a little ape.

† *Plebeius phönix*, Röber, Iris, vol. i, p. 61, pl. iv, fig. 26 (1886).

and slender and ends in two opposing points like a pair of pincers. As to the egg, in that of *Neopithecops* the raised lines form triangles laterally, in that of *Pithecops* quadrangles. Both genera are apparently more or less protected, and are mimiced by certain rare species of *Logania (Gerydinæ)* and *Cyaniris (Lycæninæ)*." (*Doherty*, l. c.)

P. fulgens is a very beautiful little species, of which Mr. Doherty has kindly given me two pairs. It is perhaps one of the most interesting new species that he has hitherto discovered.

I give below* a description of the genus *Una*, mihi, which contains a single species occurring in the Malay Peninsula. The male sex of *U. usta*, Distant, is alone known up to the present. On the upperside it has a strong superficial resemblance to the tailless form of *Nacaduba ardates*, Moore, the outline, as also the colour, being much the same; it also agrees in size and shape with *Megisba*, Moore. The coloration and markings of the underside are, however, quite different from either of these genera, and are unlike those of any Indian butterfly.

Neopithecops, Distant, is a very remarkable little genus which has a strong superficial likeness to *Pithecops*, Horsfield, and moreover similar habits and flight in the perfect state. It has the costa of the forewing more strongly arched than in any other genus of this group, thus permitting of the wide separation of the costal nervure and first and second subcostal nervules. The males have no secondary sexual characters. The genus occurs in India, Ceylon, the Andaman Isles, Burma, and the Malay Peninsula and Archipelago.

Genus 103.—NEOPITHECOPS, Distant. (PLATE XXVI).

Neopithecops, Distant, Rhop. Malay., p. 209 (1884); *Parapithecops*, Moore, Journ. A. S. B., vol. liii, pt. 2, p. 20 (1884); *Pithecops*, id. (*nec* Horsfield), Lep. Cey., vol. i, p. 72 (1881).

"FOREWING, small, very broad, elliptical; [*costa*] much arched from the base, *exterior margin* convex, *posterior* margin of equal length with the anterior, [sinuous]; *costal nervure* extending to less than half length of the margin; *subcostal nervules* very short, *first* subcostal emitted at one-half before the end of the discoidal cell, *second* at one-third before its end, *third* at one-sixth before its end, *fourth* at one-half beyond the cell and terminating on the costa

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* Genus UNA, nov.

Outline of wings almost exactly as in *Azanus ubaldus*, Cramer. FOREWING, triangular; *costa* nearly straight, *apex* acute, *outer margin* very slightly convex, *inner* margin straight; *costal nervure* terminating beyond the apex of the discoidal cell; *first subcostal nervule* immediately after its origin anastomosed completely with the costal nervure as in the genus *Pithecops*, Horsfield, and not again becoming free; *second* subcostal nervule with its origin half as far from that of the first as that of the second is from that of the upper discoidal; *third* subcostal nervule with its origin a little nearer to the apex of the wing than to the apex of the cell; *middle disco-cellular* nervule arising from the upper discoidal some distance beyond its base, concave, upright; *lower* disco-cellular as long as the middle, also concave and upright; *second median* nervule originating some little distance before the lower end of the cell; *submedian nervure* nearly straight. HINDWING, *costa* slightly arched, *outer margin* convex, *apex* rounded, *anal angle* rather acute, *abdominal margin* nearly straight; *costal* nervure strongly arched at base, thence straight to apex; *first subcostal nervule* originating some little distance before apex of cell; *upper disco-cellular* nervule slightly outwardly oblique and slightly concave, *lower* disco-cellular upright, slightly concave; *second median* nervule arising a little before the lower end of the cell; *submedian nervure* straight; *internal* nervure recurved, short. *Palpi* with the first and second joints furnished with long bristly hairs, third joint long, naked, acicular. *Eyes* hairy. *Antennæ* about half the length of the costa of the forewing, distinctly annulated with white, with a large spatulate club. *Body* rather robust, not quite reaching to anal angle of hindwing.

It is very difficult to say to what genus *Una* is nearest allied. In neuration it is very close to *Pithecops*, as it has the costal nervure and first subcostal nervule anastomosed in the same way, but it differs widely from *Pithecops* in outline and *facies*. On the upperside *U. usta* is nearest to the tailless form of *Nacaduba ardates*, Moore, and to *N. hampsonii*, mihi. In outline it agrees with *Azanus ubaldus*, Cramer. On the whole it is perhaps nearest to *Nacaduba*, but the spotted underside of the type species reminds one more of the genus *Zizera*, Moore, than anything else. On account of its neuration, I place it next following *Pithecops*.

Una usta, Distant. *Zizera ? usta*, Distant, Ann. and Mag. of Nat. Hist., fifth series, vol. xvii, p. 531 (1886); idem, id., Rhop. Malay., p. 454, n. 4, pl. xliv, fig. 5 (1886). HABITAT: Malacca. EXPANSE: ·8 to 1·2 inches. DESCRIPTION: "UPPERSIDE, *both wings* violaceous-brown. UNDERSIDE, *both wings* greyish-ochraceous. *Forewing* with two contiguous fuscous spots in the middle of the cell, a fuscous disco-cellular spot at the end of the cell, and five spots of the same colour in a curved submarginal series. *Hindwing* with two large black spots near the costal margin, the outermost with a small fuscous spot beneath it, a small fuscous spot in the cell, and a disco-cellular streak of the same colour at the end of the cell; and with the following blackish spots:—one beneath and near the base of the cell, two near the abdominal margin, one near the anal angle, and four in a curved series beyond the cell, and with a double series of pale fuscous, linear, submarginal spots [which are continued on to the forewing]. *Cilia* of both wings fuscous. *Body* and *legs* more or less concolorous with wings."

"I place this species provisionally in the genus *Zizera*, from which it differs by having the first subcostal nervule completely anastomosed with the costal nervure [except a short free basal portion]. The typical specimen, however, is not only unique, but also not my own property, thus preventing that detailed structural examination which is necessary for exact generic determination, but which is liable at the same time to injure the specimen." (*Distant*, l. c. in Rhop. Malay.)

The sex of the type specimen is not stated, it is probably a male.

before the apex, *fifth* [upper discoidal] from the end of the cell ; *disco-cellular* nervules very slender, *middle* disco-cellular slightly longest, nearly straight ; *discoidal cell* long, broad ; *second median nervule* emitted at one-sixth before the end of the cell, *first* median at nearly one-half before its end ; *submedian nervure* straight. HINDWING, small, very broad, oval ; *exterior margin* very convex ; *costal nervure* arched at the base, extending to the apex ; *first subcostal nervule* emitted at one-fourth before the end of the cell ; *disco-cellular* nervules very slender, *upper* disco-cellular curved outwards, *lower* disco-cellular curved inwards ; *discoidal cell* broad ; *third* and *second median nervules* emitted from the end of the cell, *first* median at one-third before its end ; *submedian* and *internal nervures* straight. BODY slender ; *palpi* porrect, slender, clothed with short lax scales, second joint laterally compressed, long, projecting half its length beyond the head, third joint about half its length, longer in the female, slightly clavate at the tip in the male and cylindrical in the female ; *legs* slender, fore tarsi composed of five joints, laterally spined, and in the male with a terminal bifid claw and in the female with a blunt claw ; *antennæ* with a well-formed lengthened spatular club." (*Moore*, l. c. in Lep. Cey.)

In the forewing the costal nervure terminates before the end of the cell, the first subcostal nervule terminates just beyond its end, the base of the second subcostal is rather nearer to the base of the first than to that of the upper discoidal, the third subcostal is emitted about midway between the base of the upper discoidal and the apex of the wing ; the eyes are naked.

"This genus is quite distinct from *Pithecops*, Horsfield, (of which the type is the Javan species *P. hylax*, Fabricius), although similarity in colouring and markings has led to considerable confusion. In *Pithecops* the first subcostal nervule is distinctly and strongly anastomosed with the costal nervure, in *Neopithecops* that nervule is quite free and situated some clear distance from the costal nervure." (*Distant*, l. c.)

As far as I am aware, *Neopithecops* occurs only in India, Ceylon, the Andaman Isles, in Burma, and the Malay Peninsula, though Herr Röber has described what is probably a species of this genus (Iris, vol. i, p. 61, pl. iv, fig. 5 (1886) from the Aru and Key Islands under the name of *Plebeius lucifer*. Mr. Doherty notes that "*N. zalmora* is commoner than *Pithecops hylax*, Fabricius, at Mergui and Myitta, Burma, and occurs in Java and Sumba, but is rare in both. It is common from the Chittagong Hill Tracts to South-Eastern Borneo." With regard to the described species from the Indian region, I recognise only one as distinct. Mr. Distant says that there is an undescribed form from the Andaman Isles, Mr. Moore proposes to name the form occurring in the Nilgiri Hills *N. todara*, which with the four already described makes six in all. All these species appear to me to owe their origin to the want of appreciation of the great extent of the seasonal dimorphism which obtains in them, at any rate in those districts where there are two well-marked seasons, a dry and a wet. The darkest of all is *N. horsfieldi*, Distant, described from a single male specimen from Singapore ; this form has no white whatever on the upperside, and may be constant in the Malay Peninsula, where it rains, I believe, almost throughout the year, so that there is no distinct dry-season. This form is found in Calcutta, in the Malda district, and doubtless elsewhere during the rains. *N. zalmora* is said to have a small white patch on the disc of the forewing, none on the hindwing, as also have *N. lucifer*, Röber, and the form which occurs in the Andamans. *N. dharma* has small patches on both wings. Mr. Butler in naming the former species gave no habitat for it, but Mr. Moore has recorded it from the N.-W. Himalayas (not improbably these specimens were some from Calcutta I sent Mr. Hocking, and which he omitted to label), and writes me that it occurs in the Calcutta district ; *N. dharma* comes from Ceylon. *N. gaura* has the white patches the largest of all, occupying more than half the upper surface of the wings. Mr. Moore described it from Calcutta and Assam, but it occurs in the Malda district and in Orissa as well, and doubtless elsewhere. It is found in the middle of the dry-season in Calcutta, and also differs from the wet-season form in having all the markings of the underside more or less obliterated. The MS. species *todara* from the Nilgiris has the patches of moderate size as in *N. dharma*. The Andaman form might perhaps be considered distinct

as it always, as far as I know, has a moderate-sized white patch on the upperside of the forewing, none whatever on the hindwing; the entirely dark hindwing combined with a white-patched forewing occurs however in some specimens from Calcutta, and has been described by Mr. Moore as characteristic of the female sex of *N. dharma* from Ceylon. These are the features by which typical *N. zalmora* and *N. lucifer* may be known. Mr. Doherty informs me that he observed no species of the genus in Upper Assam, but that one occurs rarely in East Java. The females are apparently marked much as are the males. The transformations of the genus are unknown.

641. **Neopithecops zalmora,** Butler. (PLATE XXVI, FIG. 162 ♀).

Pithecops zalmora, Butler, Cat. Fab. Lep. B. M., p. 161 (1869); id., Moore, Proc. Zool. Soc. Lond., 1880, p. 244; id., Doherty, Journ. A. S. B., vol. lv, pt. 2, p. 134, n. 188 (1886); *Neopithecops zalmora*, de Nicéville, Journ. A. S. B., vol. liv, pt. 2, p. 46, n. 58 (1885); *Lycæna hylax*, Doubleday and Hewitson (*nec* Fabricius), Gen. Diurn. Lep., vol. ii, p. 496, n. 198, pl. lxxvi, fig. 8 (1852); *Pithecops hylax*, Moore (*nec* Fabricius), Proc. Zool. Soc. Lond., 1877, p. 587; *Pithecops dharma*, Moore, Lep. Cey., vol. i, p. 72, pl. xxxiv, fig. 4, *male* (1881); *Parapithecops gaura*, id., Journ. A. S. B., vol. liii, pt. 2, p. 20 (1884); *Neopithecops horsfieldi*, Distant, Rhop. Malay., p. 210, n. 1, pl. xxii, fig. 15, *male* (1884).

HABITAT: N.-W. Himalayas? Kumaon, Malda district, Calcutta district, Sikkim, Assam, Burma, Orissa, Nilgiris, Cannanore, Ceylon, Malay Peninsula, Kankaret (Burma) and Padang in Sumatra *(Elwes)*; Java, Sumba, Sambawa, South-Eastern Borneo *(Doherty)*.

EXPANSE: ♂ ♀, ·8 to 1·1 inches.

Wet-season form.

DESCRIPTION: "MALE. UPPERSIDE, *both wings* dark purplish. *Forewing* with the apex and outer margin distinctly and broadly darker. *Cilia* dark on the forewing, greyish-white on the hindwing. UNDERSIDE, *both wings* greyish-white. *Forewing* with the following brownish markings:—an oblique line extending from the costa to the upper discoidal nervule, followed by a broken transverse linear fascia, a more continuous submarginal linear fascia, between which and the outer margin are a series of linear spots, and an outer marginal line. *Hindwing* with a large blackish spot near the apex, and brownish markings as on the forewing. *Body* above and beneath more or less concolorous with the wings; *legs* greyish-white, more or less annulated with brownish." (*Distant*, l. c.)

This form, the darkest of all, occurs in Calcutta in the middle of the rains (July and August), in the Malda district, and doubtless in other parts of India, and was described from Singapore by Mr. Distant under the name of *N. horsfieldi.*

Dry-season form.

DESCRIPTION: "MALE and FEMALE. UPPERSIDE, *both wings* brown. *Forewing* with a large white medial longitudinally-oval patch, occupying the middle of the wing from the middle of the disc to near the base; a small brown dentate spot at the upper end of the cell. *Hindwing* with the apical and upper discal areas broadly white, and traversed by pale brown veins; a slender brown submarginal line enclosing a marginal row of brown spots. *Cilia* of forewing whitish posteriorly, of hindwing entirely white. UNDERSIDE, *both wings* greyish-white. *Forewing* with a submarginal line composed of slender waved brown lunules, and a marginal line enclosing a row of small linear spots; a slender indistinct brown streak at the end of the cell, and three or four dots along the costal edge. *Hindwing* with an irregular submarginal row of brown lunules, a marginal line enclosing a row of darker spots; a black spot at the upper end of the submarginal line, and a subbasal row of three smaller more or less distinct black spots; a slender brown streak at the end of the cell. *Antennæ* black, ringed with white. [*Palpi*] pale white beneath, third joint and tip of second black. *Legs* white, banded with black." (*Moore*, l. c.)

This form was described by Mr. Moore under the name of *Parapithecops gaura* from Calcutta and Assam, to which I add Bholahât in the Malda district and Orissa. It occurs in the height of the dry-season in Calcutta.

Intermediate between these two extremes are typical *N. zalmora*, Butler, and *N. dharma*, Moore, the former described without locality, the latter from Ceylon. They are found wherever

the dry- and wet-season forms of *N. zalmora* occur, probably a moderate amount of moisture being required for their development. I give below the description of these two pseudo-species.*

I am surprised to find that *N. zalmora* has not been recorded from the Bombay presidency, though the moist climate of the coast seems to me to be eminently suited to it. Mr. W. Doherty obtained it at Jhulaghat, Kali Valley, Kumaon, at 2,000 feet; Mr. W. H. Irvine has sent me a very fine series, showing its great variation, and embracing all the forms of the species, from Bholahât in the Malda district; it occurs throughout the year, and in all forms, in Calcutta; Mr. W. C. Taylor also has sent me all forms from Orissa; it is common on the lower slopes of the Nilgiris, writes Mr. G. F. Hampson, who adds "*N. zalmora*, Butler, and *N. todara*, Moore, MS., are probably seasonal forms of one species;" I have it from Cannanore; in Ceylon it occurs in the "Eastern Province; in beds of dry rivers in forest land. Taken in August on road to Trincomalee in damp places in beds of streams in abundance" (*Hutchison*); "Kandy" (*Wade*); it occurs also in Sikkim and Assam, probably throughout Burma, in the Andaman Isles, and at Singapore. It has a weak fluttering flight, and in Calcutta is almost always found under the shade of trees and bushes, on which it settles, and not on the ground.

The figure shews both sides of a female specimen of the dry-season form from Calcutta. This specimen is Mr. Moore's type of "*Parapithecops*" *gaura*, and is deposited in the collection of the Indian Museum, Calcutta.

The next two genera are remarkable in having extremely short antennæ, a little more than one-third the length of the costal margin of the forewing; the third subcostal nervule is also unusually long. *Spalgis*, Moore, occurs in India, Ceylon, the Andamans, Nias Island, Amboina, Celebes, and in the isle of Hainan. *Taraka*, Doherty, MS., occurs in North-Eastern India, Burma, the Malay Peninsula, and probably in some at any rate of the Malay Islands, and again in China and Japan. (Since the above was written, Mr. Doherty has recorded it from Eastern Java.) Neither genus possesses secondary sexual characters in the male.

Genus 104.—SPALGIS, Moore. (PLATE XXVI).

Spalgis, Moore, Proc. Zool. Soc. Lond., 1879, p. 137; idem, id., Lep. Cey., vol. i, p. 70 (1881); *Lucia* (*part*), Westwood, Gen. Diurn. Lep., vol. ii, p. 501 (1852).

"Allied to *Gerydius* [= *Gerydus*], type *symethus*, Horsfield. MALE, with the FOREWING more trigonal, the *costa* straighter, the *third subcostal nervule* bifid, the *fifth* [upper discoidal] starting from the end of the cell. HINDWING also more trigonal in the male, the *exterior margin* even in both sexes. *Antennæ* short, club thickish." (*Moore*, l. c. in Proc. Zool. Soc. Lond.)

"WINGS small, *exterior margins* even. MALE. FOREWING, triangular, *costa* scarcely arched at the base, *apex* somewhat acute, *exterior margin* oblique, almost straight, *posterior* margin rather long; *costal nervure* at some distance from the margin, extending to half its

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* *Neopithecops (Pithecops) zalmora*, Butler, Cat. Fab. Lep. B. M., p. 161 (1869); *Neopithecops zalmora*, de Nicéville, Journ. A. S. B., vol. liv, pt. 2, p. 46, n. 58 (1885). HABITAT: Not given. EXPANSE: Not given. DESCRIPTION: "More robust than *Pithecops nylax*, Fabricius, marked above with white, and with more brown lines below." (*Butler*, l.c.)

"This species has never been properly characterized, and I am unable to say in what particulars it is supposed to differ from *N. gaura*, Moore. At any rate the species of *Neopithecops* occurring in Calcutta are exceedingly variable, some specimens are entirely black on the upperside, others have the costal and outer margins of the fore- and hindwings black, all the rest of the surface white, and there is every gradation between these extremes. Mr. Moore writes to me:—'*N. gaura* can be distinguished by its broad white discal area in both wings of both sexes. *N. zalmora* has a small discal white patch on the forewing only. I have both from the Calcutta district.'" (*de Nicéville*, l. c.)

Neopithecops (Pithecops) dharma, Moore, Lep. Cey., p. 72, pl. xxxiv, fig. 4, *male* (1881). HABITAT: Ceylon. EXPANSE: *Male*, ·75; *female*, 1·00 inch. DESCRIPTION: "MALE: UPPERSIDE, *both wings* vinous-brown. *Forewing* with the middle of the discal area slightly white-speckled, costal edge white-streaked. *Hindwing* with the outer upper area broadly white; a marginal row of brown oval spots, each encircled by a white border. *Cilia* white. UNDERSIDE, *both wings* bluish-white. *Forewing* with brown streaks on the edge of the costa, a brown curved streak at the end of the cell, an outer discal transverse curved row of six short waved streaks, and a marginal row of narrow spots, bordered within by a slender line, and outwardly by the marginal line. *Hindwing* with three transverse subbasal black spots, another on the middle of the abdominal margin, and a larger one on the costal margin near the apex; a brown disco-cellular streak, a discal zigzag series of six narrow brown streaks, and a marginal row of small blackish spots bordered inwardly by a narrow brown line and outwardly by the marginal line. *Body* brown, white beneath. *Palpi* black above. *Legs* with black bands. *Antennæ* black, with white annulations. FEMALE. UPPERSIDE, *both wings* more intense brown, the discal white-speckled patch on the *forewing* more distinct. *Hindwing* entirely brown. UNDERSIDE, *both wings* with the markings more prominent than in the male." (*Moore*, l. c.)

length; *first* and *second subcostal nervules* short, first emitted at nearly one-half before the end of the cell, second at one-fourth before the end, *third* at one-third beyond the cell, *fourth* terminating at the apex, *fifth* (or upper radial) from the end of the cell; *disco-cellular* nervules slender, almost straight, the *radial* [lower discoidal nervule] from their middle; *discoidal cell* long, extending fully to half the wing; *second median nervule* emitted at a short distance before the end of the cell, *first* median at one-half before its end; *submedian nervure* straight. HINDWING, ovate, short; *costal nervure* very convex from the base, extending to the apex; *first subcostal nervule* emitted at one-fourth before the end of the cell; *disco-cellular* nervules very slender, the *radial* from their middle; *third* and *second median* nervules from the end of the cell, *first* median at half distance before the end; *submedian nervure* straight; *internal* nervure recurved, [long]. FEMALE. FOREWING, less triangular, *exterior margin* convex, *posterior* margin long. HINDWING, convex externally. BODY slender, *abdomen* long; [*eyes* naked]; *palpi* long, slender, clothed with very short hairy scales, second joint projecting half its length beyond the head, third joint half its length; *legs* short, *femora* delicately pilose beneath, fore *tarsi* of the male minutely spinous at the side; *antennæ* short, with a thickened club." (Moore, l. c. in Lep. Cey.)

Mr. Moore, from Dr. Thwaites' observations in Ceylon, figures the larva of this species with elongated divergent pointed processes or tubercles. Mr. E. E. Green has sent me drawings of quite a different larva, which entirely lacks these processes, being covered instead with minute dark bristles, and furnished with a lateral fringe of hairs. Mr. Moore gives the food-plant as *Euphorbiaceæ*. Mr. Green says the larva is carnivorous. Mr. Moore shows the pupa hanging down free and at right angles to a horizontal leaf stalk, a most unusual position to be assumed by a pupa of this family, though the pupa of *Poritia hartertii*, Doherty, hangs free, but in a different position. Mr. Green has not informed me of the position assumed by his pupæ.

The genus *Spalgis* is a very small one, containing only five or six described species. It occurs in India, Ceylon, the Andamans, in Nias Island (*S. fangola*, Kheil), in Amboina (*S. pharnus*, Felder), in Celebes (*S. substrigata*, Snellen), and the Island of Hainan off the south coast of China (*S. dilama*, Moore). All the species are very closely allied, are small, on the upperside of a dark brown colour slightly tinged with violet, with a small pale patch in the male, usually with a larger one in the female; the underside is grey, crossed by numerous very fine zigzag dark brown lines, with a prominent whitish oval spot at the end of the cell in the forewing; this spot is sometimes seen in the hindwing also. The sexes differ a good deal in shape, the outer margin of the forewing being very straight and the apex acute in the male, the outer margin highly convex and the apex rounded in the female. Mr. Doherty notes that "the egg of *Spalgis* is flattened above and delicately reticulated with irregular hexagons. Its position can hardly be understood till the insects of tropical Africa, the great storehouse of low forms of *Lycænidæ*, are better known." (Journ. A. S. B., vol. lviii, pt. 2, p. (1889).

Key to the Indian species of Spalgis.

A. Forewing, upperside in the male with a prominent white discal spot, in the female with a broad white discal area.

642. S. EPIUS, India, Ceylon, Burma.

B. Forewing, upperside in both sexes with inconspicuous discal spots.

643. S. NUBILUS, South Andaman Isles, Borneo.

642. Spalgis epius, Westwood. (PLATE XXVI, FIG. 163 ♂).

Lucia epius, Westwood, Gen. Diurn. Lep., vol. ii, p. 502, n. 2; *Geridus epeus*, Doubleday and Hewitson, l. c., pl. lxxvi, fig. 5, *female* (1852); *Spalgis epius*, Moore, Proc. Zool. Soc. Lond., 1879, p. 137; idem, id., Lep. Cey., vol. i, p. 71, pl xxxiv, figs. 1, *male*; 1a, *female*; 1b, *larvæ* and *pupæ* (1881).

HABITAT: Malda, Sikkim, Calcutta, South India, Ceylon, Burma.

EXPANSE: ·9 to 1·2 inches.

DESCRIPTION: "On the UNDERSIDE, *both wings* of this species are dirty whitish coloured, with a number of very slender equidistant irregular undulating brown lines, without ocelli; and the discoidal cell of the *forewing* with a small brown dot near the base, and another oval and transverse in the middle." (*Westwood*, l. c.)

"MALE. UPPERSIDE, *both wings* violet-brown. *Forewing* with a white quadrate spot from the end of the cell. UNDERSIDE, *both wings* greyish-white, with indistinct pale brown oval basal

marks, and several outer transverse interrupted zigzag lines. FEMALE. UPPERSIDE, *both wings* paler. *Forewing* with a broader diffused white discal space, and a blackish disco-cellular lunular mark. *Cilia* whitish. UNDERSIDE, *both wings* whiter, markings bolder. *Antennæ* reddish, with black and white basal articulations. *Legs* banded with brown."

"LARVA, pale green, the segments armed with elongated divergent pointed processes. Feeds on *Euphorbiaceæ*. PUPA, small, dilated in the middle." (*Moore*, l. c. in Lep. Cey.)

The male of *S. epius* appears to be very constant in its markings, but the female varies considerably. In one extreme the upperside of the forewing has a diffused whitish patch on the disc as small as in the male, in the other extreme this patch occupies the whole surface except a costal and outer even border of the ground-colour, and the hindwing has much whitish diffused over the disc. The larva, as figured by Mr. Moore, is a most extraordinary object, and, as far as I know, quite unique amongst the *Lycænidæ*. It possesses numerous long diverging fleshy processes or tubercles, some of which are coloured green and others deep red. One of the figures of the pupa as shown in the "Lepidoptera of Ceylon" is suspended head downwards by the tail like a Nymphalid pupa; this is probably incorrect. It also is pale green marked with deep red like the larva, and has a large hump on the middle of the back. Mr. E. E. Green, of Pundul-oya, Ceylon, has sent me drawings of the larva and pupa of this species which are quite different from those given by Mr. Moore. Mr. Green writes: "I have several times reared an insect indistinguishable from *S. epius* from a carnivorous larva that associates with and feeds upon *Dactylopius adonidum* (the "mealy-bug" of planters). Mr. Moore, however, figures a quite distinct larva for this species in his 'Lepidoptera of Ceylon,' and quotes *Euphorbiaceæ* as its food. Either there must be some error in Moore's figure, or we have two distinct species or even genera, which are indistinguishable as imagines. My larvæ were dull olive-green above with numerous minute dark bristles and a lateral fringe of brown hairs, beneath pale green, slightly suffused with pink on anterior segments. It partially covers and conceals itself with the mealy secretion from the *Dactylopius*. Pupa various shades of brown, wing-cases pale."

The observations of Mr. Green's are of very great interest, and I trust he will confirm them, though, as he has "several times" reared the larvæ, there can hardly be any mistake on his part. It would be most desirable to rediscover the larva and pupa that Dr. Thwaites reared; the peculiarities regarding it are many, and it appears possible that some mistake has occurred in his observations. The discovery of a carnivorous butterfly larva in India is particularly interesting; as far as I am aware only one other is known, *Fenesica tarquinius*, Fabricius, of the family *Lycænidæ*, but placed by Mr. W. H. Edwards in the *Nemeobiinæ*, and described fully by him in the Canadian Entomologist, vol. xviii, p. 141, *et seq*. (1886).

S. epius has been taken at Bholahât, Malda; it occurs in Sikkim in May, June, and October somewhat rarely; in Calcutta I took it twice in the Botanical Gardens on a bush named *Randia dumetorum*, Lamk., in August, 1882, and again in September, 1883; it occurs also in Orissa in January, March, August and December; in Ganjam; at Bangalore in August and September; on Karanja, Bombay, in February, August and September; in the Nilgiris on the lower slopes; in Travancore; in the "Central Provinces, Ceylon, about flower-gardens, at 3,000 feet elevation, during February, very local" (*Hutchison*); "Kandy; Kottawa forest, Galle, very common and easy to capture, likes shady places and high jungle" (*Wade*); and at Mergui, December. Everywhere but in Ceylon *S. epius* appears to be a somewhat rare species, never occurring in large numbers.

The figure shows both sides of a male specimen from Ceylon in the collection of the Indian Museum, Calcutta.

643. **Spalgis nubilus**, Moore.

S. nubilus, Moore, Proc. Zool. Soc. Lond., 1883, p. 522; id., Distant and Pryer, Ann. and Mag. of Nat. Hist., fifth series, vol. xix, p. 266, n. 107 (1887).

HABITAT: South Andaman Isles, Borneo.

EXPANSE: 1·0 inch.

DESCRIPTION. "MALE. UPPERSIDE, *both wings* violet-brown. *Forewing* with a slightly darker disco-cellular lunule. UNDERSIDE, *both wings* greyish-white, with waved transverse blackish lines, and basal marks. FEMALE. UPPERSIDE, *both wings* paler than in the male. *Forewing* with a very small indistinct paler space beyond the cell."

"Distinguished from *S. epius*, Westwood, by the absence in the male of the prominent white discal spot, and the broad white discal area in the female; the markings beneath are more numerous and waved. It is also distinct from *S. dilama*, Moore,* from Hainan." (*Moore*, l. c.)

I possess but a single female of this species, taken in the Andamans by Mr. R. Wimberley. It differs from that sex of *S. epius*, Westwood, in having a small ochreous discal patch on the upperside of the forewing instead of a large whitish one. The markings of the underside seem to be much the same in the two species.

Genus 105.—TARAKA, nov., Doherty, MS. (PLATE XXVI).

Differs from *Spalgis*, Moore, in the FOREWING having the *third subcostal nervule* shorter, as it is emitted from the subcostal nervure considerably furtherfrom the apex of the discoidal cell than it is in *Spalgis*; the *disco-cellular nervules*, instead of being in one straight line and perpendicular, are differently arranged; the middle one is slightly concave and nearly perpendicular, the lower straight but inwardly oblique: in the male the *apex* of the wing is less acute, and the *outer margin* slightly convex instead of straight. In the HINDWING the *outer margin* in the male is more rounded, the *anal angle* less produced, the *internal nervure* is short, in *Spalgis* it is unusually long, nearly reaching the anal angle, and is very much longer than in *Taraka*. The style of markings on the underside is quite different, in *Spalgis* the entire surface is crossed by numerous fine zigzag dark brown lines, with a somewhat prominent whitish oval spot in the discoidal cell of the forewing; in *Taraka* there are numerous more or less rounded large black spots arranged evenly over the entire surface placed on a white ground; the *cilia* checkered instead of being concolorous. Type, *T. hamada*, Druce. Two species only are known, one of which is found in Sikkim, Assam, Burma, Eastern Java, China and Japan; the other in Perak.

I append as a footnote a very full diagnosis of this genus drawn up by Mr. W. Doherty about two years ago, but which was not published.† It was founded on his new species *T. mahanetra*. He has also recorded the following observations on the genus: "Next to *Spalgis* I place the singular genus *Taraka*, of which the type is *Miletus hamada*, Druce. This genus greatly resembles *Neopithecops*, and like it is probably protected. It may be separated from it by the narrower discoidal cell of the forewing placed nearer the costa, and the

* *Lucia dilama*, Moore, Proc. Zool. Soc. Lond., 1878, p. 701.

† Wings remarkably fragile and thin. FOREWING, *costa* regularly rounded, *apex* rather acute, *outer margin* convex, *inner* margin concave; *costal nervure* not toucbing the first subcostal nervule, a little swollen at the base; *first subcostal nervule* originates two-fifths before the end of tbe discoidal cell; *second* subcostal arising twice the distance from the base of the first as from the base of the upper discoidal; *third* subcostal arises midway between the apex of the cell and of the wing; *disco-cellular* nervules slightly produced outwardly, *lower* disco-cellular longer than the middle one and very slender, meeting the median nervule just beyond its last forking. HINDWING, long and narrow; *costa* long, *outer margin* rounded, composed of two curves meeting at the end of the second subcostal nervule, *inner* margin convex for most of its length; *costal nervure* long, extending to the apex, running close to the margin; *discoidal cell* abruptly truncate; *disco-cellular nervules* meeting the subcostal nervure just beyond its bifurcation, and the median nervure opposite its last bifurcation. *Eyes* naked. *Antennæ* with thirty joints or more (I counted thirty in *hamada*, and thirty-two in *mahanetra*, but I find it very bard to be accurate in this particular), slender, the last ten (approximately) gradually forming a moderate club, abruptly truncate at the tip, the last joint elongate. *Palpi*, last joint covered with long appressed scales, ratber short, less than half as long as the preceding joint, fusiform, pointed, not clavate. *Legs* covered witb very long wbite hairs, the middle and bind femora longer than the tibiæ which are greatly swollen in tbe middle, the tarsi as long as the tibiæ, the first joint nearly twice as long as the others united, the last joint with simple claws and paronychia. Fore-tarsi of the male slender, equal in length to the tibiæ, without spines or articulations, the claws united for most of their length, diverging at the end. Fore-tarsi of the female longer than the tibiæ, without spines, the claws as in the male, no distinct articulations; the separation of the last joint is slightly indicated but is quite immovable."

"This genus belongs to the naked-eyed division of the *Lycæninæ*. So far as I know, the species of tbis genus occur in the low-country; they are found in forest, and are very weak and moth-like in flight, and amongst the smallest and most delicate of butterflies. From *Neopithecops*, Distant, this genus differs in the remarkable structure of the fore-tarsi, which in *both* sexes are without articulations, and have the claws united at the base. This also distinguishes it from *Pithecops*, Horsfield, as well as by the free costal nervure of the forewing." (*Doherty*, MS.)

oblique disco-cellular nervules. From *Spalgis* it differs in the antennæ, which are much as in the *Pithecops* group, slender, annulated, with a short distinct terminal club, while *Spalgis* has short thick antennæ, gradually thickened. The prehensores of *Taraka* are wholly Lycæniform. The egg is remarkable, and bears a decided resemblance to those of the *Gerydinæ*, with which Mr. Druce first placed it. The apex is flattened, a little concave, irregularly reticulate, with a strong crenulated carina projecting both upwards and outwards around the margin. Seen from the side, it is irregularly quadrate, a little widest at base, the sides smooth. The egg obviously shows a relationship with that of *Liphyra*, Westwood, and the older and more generalized forms of the *Gerydinæ* included in the genus *Logania*, Distant."

"I have made a careful description of *T. mahanetra*, mihi, a very rare Malayan species somewhat resembling *Castalius elna*, Hewitson, in colouring. I caught but a single pair of this species, and both I believe are now lost. Generally, they agreed with *T. hamada* in structure, but the fore-foot of the female (as well as that of the male) was imperfect, and the joints of the tarsi immovable. As it is just possible that this peculiarity may have been due to gynandromorphism, I merely mention it, and reserve *hamada* as the type of the genus. The egg of *T. mahanetra* I unluckily do not know." (*Doherty*, Journ. A. S. B., vol. lviii, part 2, p. (1889).

644. **Taraka hamada**, Druce. (Plate XXVI, Fig. 164 ♀).

Miletus hamada, Druce, Cist. Ent., vol. i, p. 361 (1875); id., Elwes, Proc. Zool. Soc. Lond., 1881, p. 882; id., de Nicéville, Journ. A. S. B., vol. lii, pt. 2, p. 76, n. 15, pl. i, fig. 16, *female* (1883); id., Doherty, Journ. A. S. B., vol. lv, pt. 2, p. 132 (1886); id., Leech, Proc. Zool. Soc. Lond., 1887, p. 409, n. 27; id., Pryer, Rhop. Nihonica, p. 10, n. 24, pl. ii, fig. 12, *female* (1886); *Neopithecops hamada*, Elwes, Trans. Ent. Soc. Lond., 1888, p. 374, n. 237, pl. xi, fig. 2, *female*.

Habitat: Sikkim, Cachar, Shillong, Chittagong Hill Tracts, Tenasserim, Eastern Java, China, Japan.

Expanse: ♂ ♀, ·75 to 1·35 inches.

Description: "Male. Upperside, *both wings* dark brown, lightest in the middle of the forewing. Underside, *both wings* white, crossed from the costal margin of the forewing to the inner margin of the hindwing by five rows of large black spots, a fine black line round the outer margin. *Cilia* alternately black and white. Female. Upperside, *both wings* differ slightly from those of the male in being paler in colour. Underside, *both wings* have all the black spots smaller than in the male."

"This species is quite unlike any other with which I am acquainted." (*Druce*, l. c.)

"A distinct species, unlike anything I have seen from China or Japan, but nearly allied to a specimen in my collection from Darjiling, which differs in having an indistinct whitish patch on the forewing, which may be sexual. I have seen a specimen from Shanghai collected by Christoph, which comes very close to, if it is not identical with, those from Sikkim in Dr. Staudinger's collection. There is a single specimen in Pryer's collection, without indication of locality, which differs considerably from *M.* [= *T.*] *hamada* beneath, but agrees with it above." (*Elwes*, l. c. in Proc. Zool. Soc. Lond., 1881.)

"*T. hamada*, Druce, is very unlike any other member of this group [subfamily *Gerydinæ*, Doherty], if indeed it belongs to it at all. From the structure of the prehensores I should rather place it among the *Lycæninæ*. The legs are short and thick, the wings broad and rounded, the third subcostal nervule originates before the end of the cell. I did not succeed in examining its egg." (*Doherty*, l. c.) Mr. Doherty's third subcostal nervule referred to above is my upper discoidal.

"I found this species common all up the west coast of Central Japan; it also occurs at Nikko. It seems fond of water, and flew about amongst the thick bamboo-grass on the banks of streams in July and August." (*Leech*, l. c.)

"About Yokohama this is generally a very local species, being confined to isolated spots. Some specimens are quite black, and others from the mountains have a patch of greyish-white on the forewing." (*Pryer*, l. c.)

This is a somewhat common species in Sikkim at low elevations, and shows much variation in the extent of the white coloration of the upperside, one extreme being entirely black, while the other has the costa and outer margin of the forewing alone black, the black spots of the underside showing through by transparency on both wings. It occurs in Sikkim at low elevations from April, if not earlier, to December. Mr. Doherty records it from Cachar and from the Chittagong Hill Tracts ; I possess several specimens taken near Shillong, and presented to me by the Revd. Walter A. Hamilton.

The figure shows both sides of a female specimen from Sikkim in my collection.

I append a description of a second species of the genus, *T. mahanetra*, Doherty, MS., which occurs in the Malay Peninsula.*

The next genus, *Megisba*, Moore, has several peculiarities. According to my views it is monotypic, but other writers have increased the number of species in the genus to six. These additional species seem to mainly owe their origin to the fact that seasonal dimorphism largely obtains in the genus. Wherever there are two strongly marked seasons, a wet and a dry, the butterflies shew marked variations in coloration and markings, the individuals which are on the wing in the wet-season are very dark, have little or no white on the upperside of both wings, and all the markings of the underside very large and prominent ; while the individuals which fly in the dry-season, on the contrary, usually have a large patch of white on the upperside of both wings (in some examples it is so large as to occupy more than half the surface), and the markings of the underside are small, inconspicuous, and many of them obliterated altogether. The second peculiarity of this genus is that its single species, *M. malaya*, Horsfield, shares with *Nacaduba ardates*, Moore, the very unusual character of possessing tailed and tailless forms, and on these two forms two genera have been based, *Megisba*, Moore, without tails, and *Pathalia*, Moore, with tails. Whether these forms represent distinct species or not no one can, I think, say with certainty ; a fuller knowledge of their earlier stages is required to settle the matter. The tailed forms have been named *Pathalia malaya*, Horsfield, *P. sikkima*, Moore, and *P. albidisca*, Moore ; the tailless forms have been named *Megisba thwaitesi*, Moore, *M. gunga*, Swinhoe, and *M. hampsoni*, Moore, MS. I have assumed here that Mr. Moore considers that the presence or absence of the tail to be of generic importance, though, as will be noted below, he has done much to stultify this view by mixing up the tailed and tailless forms in the two genera.

The single species which I admit in the genus, *P. malaya*, Horsfield, is a small butterfly, averaging about an inch in expanse ; it is dark fuscous on the upperside, sometimes with,

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* *Taraka mahanetra*, n. sp., Doherty, MS. HABITAT : Padang Rangas, Perak. EXPANSE : *Male*, ·67 of
an inch ; *female*, over one inch. DESCRIPTION : "MALE and FEMALE. UPPERSIDE, *both wings* black, with
a band across the wings, grey on the forewing, white on the hindwing, with its edge undefined ; on the fore-
wing it extends from the inner margin, where it is widest, to the second median nervule, the upper part
projecting outwards. *Forewing*, discoidal cell crossed by two slightly paler bands, one medial, one termi-
nal. *Hindwing* white over half its area, the extreme base and all the outer part black, a transverse dark
streak across the end of the cell, and two or three similar ones on the disc ; *costa* white from the base to
the apex, hind margin whitish, the submedian nervure and first median nervule defined with grey. *Cilia*
chiefly white, except apically on the forewing. UNDERSIDE, *both wings* pure white, curiously marbled with
black and grey of various shades of intensity. *Forewing* with three spots in the cell, the basal one black,
the outer two grey, three placed above these on the costa, and one black and conspicuous, in the interno-median
interspace opposite the middle one in the cell ; the transverse discal band characteristic of the *Lycænidæ* is
very irregular, composed of quadrate dusky spots ; it is confused apically forming a large mass of black
and grey extending some distance along the costa, and reaching the extreme apex, but not the outer margin ;
between the second and third median nervules in the male (the second and first in the female), it is discal,
but in the next space below submarginal ; beyond the transverse band is a regular submarginal series of
five black lunules, concave outwardly, the lowest large and diffused ; the margin is broadly white, interrupted
by a dark spot between the second and third median nervules. *Hindwing* white, with a number of black
basal spots, a grey one across the end of the cell, one above the cell extending to the costa, a dot medially
in the cell ; transverse band with the three upper spots joined in an oblique series, united with a large dark
apical mass, in which are the two upper submarginal lunules, enlarged and black ; below this the transverse
band is composed of quadrate spots placed irregularly and wholly separated ; beyond these the marginal and
submarginal areas are in the male suffused uniformly with grey, but in the female they are white ; the sub-
marginal lunules small but well-defined. *Antennæ* annulated with black and white, the club dark. *Femora*
and *tibiæ* clothed with very long white hairs, the last three joints of all the *tarsi* black. PREHENSORES very
simple. Seen from the side the *uncus* is tapering and acute at the apex, the upper edge horizontal, the
lower sinuous, ascending to the apex. The *clasp* resembles the head of a bird, the crown high and rounded,
the beak bent down at the tip. In *T. hamada*, Druce, the uncus has the lower edge horizontal, the upper
rounded and sloping to the acute apex ; the clasps are rounded, with a hirsute projecting tubercle at the apex.
In neither species have I observed any branches to the apex."

"A male and a female taken in deep forest near Padang Rangas, Perak, Malay Peninsula." (*Doherty*, MS.)

sometimes without, a patch of white on the disc, this patch moreover being very variable in size; the wings also are glossed obscurely with purple in some lights. The underside is greyish, marked with very numerous fuscous and black spots; these in the forewing of the rains form are so numerous, being so thickly sprinkled over the disc of the wing that it would be difficult to count them; a large proportion of them have, however, entirely disappeared in the dry-season form. The opposite sexes are very similarly marked, but the female has more white on the upperside in the dry-season form than the male. As noted on page 48, Mr. Doherty is of opinion that this genus is closely allied to the genera *Pithecops*, Horsfield, and *Neopithecops*, Distant, owing to the similar construction of the egg. To judge from the imago alone, I certainly think that it is much more closely allied to the true *Lycænas*; in habits and flight it almost exactly resembles *Nacaduba ardates*, Moore. The male has no secondary sexual characters. The genus is probably strictly confined to the Indo-Malayan region.

Genus 106.—MEGISBA, Moore. (Plate XXVI).

Megisba, Moore, Lep. Cey., vol. i, p. 71 (1881); id., Distant, Rhop. Malay., p. 457 (1886); *Pathalia*, Moore, Journ. A. S. B., vol. liii, pt. 2, p. 21 (1884).

"Allied to *Pithecops* [= *Neopithecops*, Distant]. Forewing, differs in its triangular form; *first subcostal nervule* emitted at nearly one-half length before the end of the discoidal cell, *second* subcostal at one-third before its end, *third* subcostal at one-eighth, *fourth* subcostal at one-half beyond and terminating before the apex; *disco-cellular* nervules very slender; *second median* nervule emitted immediately before the end of the cell, *first* median at one-half before its end; *submedian nervure* straight. Hindwing, *apex* convex, *outer margin* oblique towards anal angle, *abdominal* margin long; *first subcostal nervule* emitted at one-fifth before the end of the cell; *second* and *third median* nervules from a short distance beyond the end of the cell. *Abdomen* long, reaching to the anal angle of the hindwing; *antennæ* with a shorter spatular club" than in *Neopithecops*; no tail to hindwing. *Eyes* naked. (*Moore*, l. c. in Lep. Cey.)

Megisba has the costa of the forewing almost straight, the apex acute, the outer margin nearly straight in the male, slightly convex in the female. *Neopithecops* has the costa strongly arched, the apex rounded, the outer margin very convex in both sexes. In *Megisba* the costal nervure terminates about opposite to the apex of the cell; the first subcostal nervule is bent upwards not far from its base towards the costal nervure, the costal nervure having the appearance of being bent down to meet it, but the two veins are free, though they approach towards each other very closely in the male, not quite so closely in the female; the second subcostal nervule has its base midway between the bases of the first subcostal and the upper discoidal; the third subcostal originates about midway between the base of the upper discoidal and the apex of the wing; the middle and lower disco-cellular nervules are of about equal length, the middle outwardly, the lower inwardly, oblique; the second median nervule originates a little before the lower end of the cell.

Mr. Moore has described as follows a genus which he has named *Pathalia*: "Closely allied to *Megisba*. Forewing, comparatively longer and less regularly triangular in form. Hindwing, somewhat narrower, and with a slender tail at the end of the first median nervule. *Venation* similar. Second joint of *palpi* shorter, the third joint longer and more slender. Type, *P. albidisca*, Moore." It might have been assumed that Mr. Moore intended that the presence of the tail in *Pathalia* should be the distinguishing character between it and *Megisba*, no other characters of any value being given or stated with any precision, but this view is negatived by his having placed in the genus *Megisba* a species (*sikkima*) which has tails, and by his having named for the Indian Museum, Calcutta, certain tailed specimens from the Andaman Isles, Bholahât, and Sikkim, "*Megisba thwaitesi*," that species not possessing those appendages typically. The genus *Pathalia* has therefore no *locus standi*, and but one genus only can be recognized for these insects: moreover it would seem that they really form but one species only, as the presence or absence of the tail is not even of specific value, and there is evidently so much seasonal variation, at any rate in Sikkim, in this one species, that that phenomenon can satisfactorily account for the entire absence of white on the upperside in one form of the species which appears in

the rains, and in the presence of an area of white larger than the black ground-colour, and the more or less obliteration of the markings of the underside, in the extreme of the other form which occurs in the middle of the dry-season, on which characters the various species described appear to have been based.

In general appearance *Megisba malaya*, Horsfield, is very similar to *Neopithecops zalmora*, Butler, but, as indicated above, the outline of the forewing is very different. In markings the two species are almost identical, the four black dots along the costa of the forewing on the underside being a feature common to both, and absent I think from every other Indian butterfly except *Taraka hamada*, Druce. With regard to its distribution it occurs in the N.-W. Himalayas, and thence eastwards to Assam, in the Malda district, Calcutta, Orissa, Ganjam, Poona, the Nilgiris, Ceylon, the Andaman and Nicobar Islands, Burma, the Malay Peninsula, Java, Borneo, Sumba, and Sambawa. The sexes are much alike, the female having rather broader wings, and the apex of the forewing more rounded, the outer margin is more convex than in the male. The transformations of the Ceylon form of the species are given under the description of *M. malaya*.

645. **Megisba malaya**, Horsfield. (PLATE XXVI, FIG. 165 ♂).

Lycæna malaya, Horsfield, Cat. Lep. E. I. C , p. 70, n. 4 (1828) ; *Lampides malaya*, de Nicéville, Journ. A. S. B., vol. l, pt. 2, p. 58, n. 101 (1881) ; id., Wood-Mason and de Nicéville, l. c., p. 249, n. 55 ; *Pathalia malaya*, Moore, l. c., vol. liii, pt. 2, p. 22 (1884) ; id., Doherty, l. c., vol. lv, pt. 2, p. 134, n. 189 (1886) ; *P.? malaya*, Wood-Mason and de Nicéville, l. c., p. 364, n. 108 ; *Megisba malaya*, Elwes, Trans. Ent. Soc. Lond., 1888, p. 375, n. 239, pl. xi, fig. 1, *male* ; *Megisba thwaitesi*, Moore, Lep. Cey., vol. 1, p. 71, pl. xxxiv, figs. 3, 3*a*, *imago* ; 3*b*, *larva* and *pupa* (1881) ; id., de Nicéville, Journ. A. S. B., vol. liv, pt. 2, p. 46, n. 56, (1885); id., Distant, Rhop. Malay., p. 457, n. 1, pl. xliv, fig. 4 (1886); *Megisba sikkima*, Moore, Journ. A. S. B., vol. liii, pt. 2, p. 21 (1884) ; *Pathalia albidisca*, id., l. c. ; *Megisba gunga*, Swinhoe, Proc. Zool. Soc., Lond., 1885, p. 133, n. 66, pl. ix, fig. 7 ; *Megisba hampsoni*, Moore, MS.

HABITAT : N.-W. Himalayas, Kumaon, Malda District, Sikkim, Cachar, Calcutta, Orissa, Ganjam, Poona, the Nilgiris, Ceylon, the Andaman and Nicobar Isles, Burma, the Malay Peninsula, Sumatra, Java, Borneo, Sumba, Sambawa.

EXPANSE : ♂ ♀, ·8 to 1·2 inches.

DESCRIPTION : FEMALE. " UPPERSIDE, *both wings* blackish-brown, with a large white medial area, extending obliquely from the middle of the fore- to the disc of the hind wing ; colour more intense on the *forewing*, the posterior margin of which is surrounded with a delicate white *cilia*, which is continued along the inner border of the hindwing by a series of elongated silky hairs. *Tail* black, tipped with white. UNDERSIDE, *both wings* pure satin white. *Forewing*, near the costa, marked with four regular, equidistant, minute brown dots, and on the disc with a short curved line ; towards the posterior margin follows a curved striga, consisting of short lineolæ or arcs, not touching each other, but disposed obliquely between the nervures ; then, parallel with the margin, two narrow strigæ, the interior one being undulated, including a series of oblong, attenuated, dark brown spots. *Hindwing* has these strigæ and dots continued uniformly through it to the anal angle ; anterior to these is an interrupted macular fascia, resembling the curved band of the forewing, but with broader lineolæ ; then a short, transverse, discoidal arc ; with five intensely black spots, two marginal and three basal, the former are large, regularly round, of an intense black tint, one is placed near the outer, the other near the inner apical angle, opposite to the caudal appendage, being separated from the anal angle by two small dots ; near the base are three transversely disposed equidistant dots of an intensely black tint." (*Horsfield*, l. c.) This description applies exactly to the dry-season form of the species.

" LARVA [of the tailless Ceylon form *thwaitesi*], light green, vermiform, middle segments swollen. Feeds on *Sapindaceæ*. PUPA, thick, blunt at the ends." (*Moore*, l. c. in Lep. Cey.)

Mr. Doherty states that " all my Kumaon specimens, as well as those taken by me in Burma and Chittagong, are tailed, while in Orissa, Ceylon, and the Eastern and Western Ghâts, their place seems to be taken by a tailless form. Of this last, those from Ceylon and the Western Ghâts are apparently *Megisba thwaitesi*, Moore, but those from Orissa and the Eastern

Ghâts seem to me identical with *P. malaya*, except in the absence of the tail. The occurrence likewise of the tailless form of *Nacaduba ardates*, Moore, in those districts is worthy of remark." (*Doherty*, l. c.)

"One male, Irangmara, Cachar, 18th July. This specimen possesses tails, going therefore into Mr. Moore's genus *Pathalia*; and it is entirely black on the upperside. A complete gradation can be made from this black form [named *M. sikkima*, Moore] to one with the white area on the upperside of both wings more extensive than the black ground-colour, which latter form has been described by Mr. Moore as *P. albidisca*. In Mr. Moore's genus *Megisba*, which has no tails, the same variation occurs: *M. thwaitesi* from Ceylon has a small patch of white on the upperside of the forewing only, *M. sikkima* is entirely black, but there are other specimens from Sikkim which have the white area above of greater extent than the black. The type of *M. sikkima* is in the Indian Museum, Calcutta, and has tails; so perhaps Mr. Moore does not consider the presence or absence of the tails to be of generic consequence. He has also named for the Indian Museum, Calcutta, some Andaman specimens of this group with tails "*Megisba thwaitesi*," still further showing that he considers the tails of no importance. In this we quite agree with him, but would carry the matter still further and treat *Pathalia malaya*, *P. albidisca*, *Megisba thwaitesi*, and *M. sikkima* as one variable tailed or tailless species." (*Wood-Mason* and *de Nicéville*, l. c. in Journ. A. S. B., vol. lv, pt. 2, p. 364, n. 108 (1887).

There is one interesting fact as regards the distribution of the tailed and tailless form of this species which should be noted. I possess both forms from one locality only, *i.e.*, Sikkim, and indeed possess but two specimens only of the tailless form from that district, the tailed form being very common there at low elevations, occurring in July, October and November at any rate, probably throughout the year. The tailed form also occurs in the N.-W. Himalayas, in Kumaon, the Malda district, Cachar, Chittagong, Malacca, the Andaman and Nicobar Isles, Java, Borneo, Sumba, and Sambawa. The tailless form occurs in Sikkim, Calcutta, the Eastern and Western Ghâts, Orissa, Ganjam, the Nilgiris, and in Ceylon.

As regards variability of markings, as noted before, Sikkim shows every possible gradation from an entirely black form to one with the white area greater than the black. From Bholahât, in the Malda district, I possess specimens quite black, some with a small patch of white on the forewing, none on the hindwing, and others with much white on both wings. From Orissa I have variations similar to those from Bholahât. From the Nilgiris I have almost quite black specimens, others with a moderate-sized white patch on the forewing. Specimens from the Andaman Isles are quite constant, having a moderate-sized white patch on the forewing only. Examples from Kamorta and Great Nicobar are equally constant, being entirely black above.

I propose to give below* for reference the original descriptions of all the species which have been described in the genera *Megisba* and *Pathalia*, fitting in as far as I can my extensive

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* *Megisba thwaitesi*, Moore, Lep. Cey., vol. i. p. 71, pl. xxxiv, figs. 3, 3*a*, *imago*; 3*b*, *larva* and *pupa* (1881); id., de Nicéville, Journ. A. S. B., vol. liv, pt. 2, p. 46, n. 56 (1885); id., Distant, Rhop. Malay., p. 457, n. 1, pl. xliv, fig. 4 (1886). HABITAT: Without tails, Ceylon; with tails, Bholahât, Sikkim, Andaman Isles (*Moore*); with tails, Malacca (*Distant*); without tails, Calcutta, Orissa, Ganjam, Ootacamund (*de Nicéville*). EXPANSE *Male*, ·9: *female*, 1·0 inch. DESCRIPTION: "MALE and FEMALE. UPPERSIDE, *both wings* dark violet-brown. *Forewing* with an oblique lower discal white-speckled patch. *Cilia* whitish. UNDERSIDE, *both wings* bluish-white. *Forewing* with four blackish spots on the middle of the costal border, one within the cell, a brown disco-cellular streak, an outer discal transverse curved series of five brown streaks, a marginal row of blackish spots bordered inwardly by a narrow sinuous line and outwardly by a linear marginal line. *Hindwing* with three black subbasal transverse spots, one on the middle of the abdominal margin, and a larger one on the costal border near the apex; a narrow brown disco-cellular streak, and a discal series of irregular-shaped spots; a marginal row of blackish spots bordered within by a sinuous line, and outwardly by a linear marginal line, the third spot from the anal angle large and blackest. *Palpi* black above. *Legs* with prominent black bands. *Antennæ* black with white annular bands."

"LARVA, light green, vermiform, middle segments swollen. Feeds on *Sapindaceæ*. PUPA, thick, blunt at the ends." (*Moore*, l. c.)

"Kandy, Ceylon. Very common and easy to capture." (*Wade*).

"A single [male] specimen taken in February in Calcutta. It probably is often overlooked owing to its close general resemblance to the species of the genus *Neopithecops*, which often actually swarm amongst busbes in shade." (*de Nicéville*, l. c.)

Megisba hampsoni, Moore, MS., which must be very close to *M. thwaitesi* judging from the Nilgiri specimens I have seen, is "found on the lower slopes" of the Nilgiris. "and is fairly common." (*G. F. Hampson*).

Mr. Distant evidently disregards the tail as of generic importance, as he distinctly says his Malacca specimen of *M. thwaitesi* has tails, while Mr Moore as distinctly describes *Megisba* as without them. No tail, however, is shown in Mr. Distant's figure of his specimen.

series of specimens from various localities. To do this I have been guided by the extent of white coloration on the upperside of the wings only. A study of these localities will, I think, tend to bring conviction to the mind that all these so-called species are but various forms of a very variable species, and are not even geographical varieties; much of this variation being due also to seasonal causes. I should add that Mr. Moore considers the true *P. malaya* to be confined to Java; that Mr. Doherty records it from Ranibagh, Bagheswar, Kapkot, Jhulaghât, Dharchula, 1-5,000 feet, all in Kumaon; and that Colonel A. M. Lang, R.E., notes that he has "only seen two or three specimens of this species in October at Ranibagh, 1,000 feet, in Kumaon."

The figure shows both sides of a male specimen of the tailed wet-season orm from Sikkim, in the Indian Museum, Calcutta. This specimen is the type of Mr. Moore's *Megisba sikkima.*

We now come to the true "Blues," to the typical genera of the *Lycæna* group. The first genus *Neolycæna*, mihi, I know very little about; it is unique in the group in possessing but two subcostal nervules to the forewing, and in being fuscous on the upperside in the male instead of blue or purple. The markings of the underside are very obscure. The next genus, *Lycæna*, Fabricius, contains the "Blues" *par excellence,* and is, I believe, strictly confined to the Palæarctic region. In Europe it is particularly well represented, Dr. Lang in his "Butterflies of Europe" enumerating over forty tailless species as belonging to it, but this number includes several species which should strictly be placed in the genera *Chilades,* Moore, *Cyaniris,* Dalman, and *Zizera,* Moore; besides several tailed species, which belong to the genera *Everes,* Hübner, *Tarucus,* Moore, and *Polyommatus,* Latreille. The true *Lycænæ* are meadow-frequenting butterflies, no single species I believe frequenting woods or forests (except wide pathways or glades through them), or ever settling on trees. The next genus, *Chilades,* Moore, hardly differs structurally from *Lycæna,* and up to the present has had but two

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Megisba sikkima, Moore, Journ. A. S. B., vol. liii, pt. 2, p. 21 (1884). HABITAT: Sikkim (*Moore*); Bholahât, Cachar, Nilgiris, and the Nicobar Isles (*de Nicéville*). EXPANSE: *Male,* ·9 inch. DESCRIPTION: "MALE. UPPERSIDE, *both wings* differ from *M. thwaitesi,* Moore, in being of a darker violet-brown. *Forewing* differs in the absence of tbe short oblique posterior white band. UNDERSIDE, *both wings* similarly marked to *M. thwaitesi,* except that on the *forewing* the black spot in the middle of the cell is very minute, and there is a spot below the end of the cell between the second and first median nervules in addition to the two dots, which are here placed beneath the first median nervule, whereas in *M. thwaitesi* the two latter dots, when present, are situated between the second and first median nervules. *Hindwing* witb the three transverse subbasal black spots comparatively larger, the upper one with two contiguous black dots in front; the cell-spot is prolonged upwards to the costal nervure, and also has some black dots below it, the apical black spot is of an elongated form, and the discal macular band is composed of broader quadrate spots." (*Moore,* l. c.)

The minute description of the spots of tbe underside is in my opinion useless, as from my long series of specimens not only do I find them when present exceedingly variable, but they are often more or less wanting in specimens which occur in tbe middle of tbe dry-season. My examples from tbe Nicobars are also very sparsely marked on the underside.

Pathalia albidisca, Moore, Journ. A. S. B., vol. liii, pt. 2, p. 21 (1884). HABITAT: N.-W. Himalayas; Chittagong; Khurda, Orissa (*Moore*); Bombay Presidency (*Aitken*); Sikkim, Bbolahât (*de Nicéville*). EXPANSE: *Male,* ·9; *female,* 1·1 incbes. DESCRIPTION: "MALE and FEMALE. UPPERSIDE, *both wings* dark violet-brown. *Forewing* with a broad medial conical white patch, which extends obliquely from the middle of the disc to the posterior margin. *Hindwing* with a broad white band crossing from the costal edge to near the middle of the abdominal margin, an indistinct marginal row of pale-bordered brown spots. UNDERSIDE, *both wings* greyish-white. *Forewing* with some black spots along the costal edge, a brown streak at the end of the cell, a discal transverse row of short, oblique, slender, interrupted lunules, a submarginal sinuous line enclosing a marginal row of indistinct spots. *Hindwing* with a similar brown cell-streak, a discal zigzag series of broader lunules. a sinuous submarginal line enclosing the marginal row of spots, of which the penultimate is large and black; three equidistant subbasal black spots, a black spot on the abdominal margin above the lower subbasal, and a larger black spot at the apex. *Tail* in both sexes black, tipped with white. *Cilia* edged with white. *Body* above black. *Antennæ* black, annulated with white. *Palpi* white, tip black. *Legs* white witb black bands." (*Moore,* l. c.)

Mr. Aitken records a few specimens of this species from different parts of the Bombay Presidency. (Journ. Bombay Nat. Hist Soc., vol. 1, p. 218, n. 67 (1886.)

Mr. Moore has made a specimen from the Chittagong district, and now in the Indian Museum, Calcutta, the type. It was taken on the 18th February, 1883, and represents the normal dry-season form of the species. This specimen has tails as it should have, being of the genus *Pathalia.* At the same time he named a tailless Orissa specimen *P. albidisca.*

Megisba gunga, Swinhoe, Proc. Zool. Soc. Lond. 1885, p. 133, n. 66, pl. ix, fig. 7. HABITAT: Poona, March. EXPANSE: 1·1 inches. DESCRIPTION: "UPPERSIDE, *both wings* black. *Cilia* white. *Forewing* with a white patch in the middle, extending from below the cell to the hinder margin. *Hindwing* with an apical and anal underneath-spot showing through, otherwise unmarked. UNDERSIDE, *both wings* milk-white, a streak at the end of each cell, marginal lines, a row of submarginal marks, then another line and a row of discal streaks. *Forewing* with a few marks on the costa. *Hindwing* with a black subcostal spot, a spot on tbe middle of tbe anal margin, a spot between these spots, one near the apex, and another near the anal angle." (*Swinhoe,* l. c.)

This description is utterly unsatisfactory and useless; the figure shews the upperside only, the rounded forewing suggesting that it is a female, the white patch indistinguishable from Ceylon specimens of *M. thwaitesi.* The sex of the specimens described is not stated, nor is any comparative description given.

species placed in it, which have a wide range in the old world. *C. laius*, Cramer, usually frequents bushes, while *C. trochilus*, Freyer, is a grass-loving species. The next genus, *Cyaniris*, Dalman, differs structurally but slightly from the two genera which precede it, but the species of these three genera to an experienced eye have a peculiar *facies* of their own, which as a rule render them easily recognisable. *Cyaniris* has an immense range in the Palæarctic region. and also occurs in the tropics in the Indo-Malayan region. All the species of the genus known to me frequent trees and bushes, they never settle on grass or live in open fields, but the males of many species are especially fond of sucking up moisture from damp spots on roads or paths, or by the sides of streams. The next genus, *Zizera*, Moore, differs structurally but slightly from the genera which precede it, but has a well-marked *facies*. It contains the smallest known butterflies, and probably occurs almost everywhere in the old world except in the Polar regions. It frequents open country, never I believe settling on trees or bushes. The two following genera, *Azanus*, Moore, and *Orthomiella*, mihi, differ considerably in structure from the four genera which come before them, as the middle portion of the first subcostal nervule of the forewing is entirely anastomosed with the costal nervure. As few writers have attempted to split up the old genus *Lycæna* in the way that is done in this work, it is difficult for me to give the distribution, even approximately, of any of these new genera. However, as far as I know, *Azanus* appears to be confined to Eastern Africa, Syria, Aden, Biluchistan, and occurs almost throughout India to Ceylon. It is probable that the genus is found all over Africa. *Orthomiella* is a monotypic genus, its single species having as yet been recorded from Sikkim only. I know nothing of the habits of these two last-named genera. None of the above-mentioned genera possess secondary sexual characters.

Genus 107.—NEOLYCÆNA, nov. (PLATE XXVI).

FOREWING, *costa* nearly straight, a little arched at base ; *apex* rather acute ; *outer margin* evenly convex ; *inner* margin slightly sinuous ; *costal nervure* ending opposite the apex of the discoidal cell ; *first subcostal nervule* originating a little beyond half the length of the cell from the base, well separated from the costal nervure ; *second* subcostal originating twice as far from the base of the first subcostal as from the base of the upper discoidal ; *middle disco-cellular* nervule originating from upper discoidal just beyond its origin, inwardly oblique ; *lower* disco-cellular in the same straight line and the same length as the middle disco-cellular, both slightly concave ; *second median* nervule originating some distance before the lower end of the discoidal cell. HINDWING, very broad, almost as broad as the forewing ; *costa* nearly straight, arched at base ; *apex* truncated ; *outer margin* slightly convex, almost straight ; *abdominal margin* straight ; *costal nervure* rather short ; *first subcostal nervule* originating some little distance before the apex of the cell, arched ; *upper disco-cellular* nervule outwardly oblique, concave ; *lower* disco-cellular a little shorter than the upper, straight, upright ; *second median* nervule originating just before the lower end of the cell ; *internal nervure* recurved. *Palpi* rather long, porrect, clothed with closely appressed scales. *Palpi* exactly half the length of the costa of the forewing, distinctly annulated with white, with a gradually-formed, moderate, rounded, rather long club. Type, *Lycæna sinensis*, Alphéraky.

The type species of *Neolycæna* is abundantly distinct from the next genus, *Lycæna*, Fabricius. In the forewing it has a subcostal nervule the less ; the second subcostal nervule originates much further from the base of the first subcostal than it does in *Lycæna*, the middle disco-cellular nervule originates nearer the base of the upper discoidal, the disco-cellular nervules are inwardly oblique instead of upright ; in the hindwing the costal nervure is very much shorter, and the whole wing is proportionally broader. The genus should be easily recognisable, as it is the only one of the Indian *Lycænidæ* with two subcostal nervules to the forewing which has no tail to the hindwing. It probably contains more species than the single one here placed in it.* *N. sinensis*, Alphéraky, is a sooty-brown insect on the upperside, without any markings

* M. Oberthür in Études d' Entomologie, vol. vi, p. 13, n. 4 (1881) states of the female of *Lycæna tengstræmi* Erschoff, which occurs at Jaxartes, in Turkestan, and almost certainly belongs to this genus, that it has a

in either sex, on the underside it is grey, with some very obscure linear white macular bands. It is only known at present from Kouldja on the western border of China, and from Biluchistan.

646. **Neolycæna sinensis**, Alphéraky. (PLATE XXVI, FIG. 166).

Lycæna sinensis, Alphéraky, Hor. Soc. Ent. Ross., vol. xvi, p. 383, n. 39, pl. xiv, fig. 7 (1881).

HABITAT : Kouldja (*Alphéraky*), Biluchistan.

EXPANSE : 1·2 inches.

DESCRIPTION : " MALE and FEMALE. UPPERSIDE, *both wings* fuscous-brown ; *cilia* interrupted with white. UNDERSIDE, *both wings* greyish-brown, with a very slender white marginal line. *Forewing* with an interrupted exterior series composed of irregular white short streaks. *Hindwing* with the disc irregularly marked with white lunules and short streaks, and with a series of submarginal dots, interiorly margined with white."

" MALE and FEMALE. UPPERSIDE, *both wings* blackish-brown ; *cilia* of the same colour, but spotted with white at the end of the veins ; but this is only very narrowly so on the fore- and more broadly on the hindwing, the cilia is similar on the underside. UNDERSIDE, *both wings* of a greyish-brown tint, very much lighter [than above]. An extremely fine bordering line runs along the exterior margin of both wings, sometimes very indistinct in the forewing. *Forewing* traversed at nearly three millimetres from the outer margin by an interrupted series of white, irregular, small streaks (lunules), with one whitish lunule placed above the first nervure and placed more towards the interior of the wing. This last [lunule] disappears entirely in some specimens. A small streak, or rather a small whitish dot, is found generally in the discoidal cell. *Hindwing* faintly dusted with white scales near its first half [the base of the wing]. The disc is sprinkled with more or less large lunules, concave towards the base, and generally shaded with blackish interiorly, and also with some white streaks not far from the base ; but the whole is so irregular and so different in each individual specimen that a figure alone could give a sufficiently exact idea of it. All along the exterior margin of both wings there is a submarginal series of small black dots, which are round and bordered with white on their interior side. These dots are very distinct on the hindwing, but on the forewing they are more or less obliterated, and sometimes they completely disappear."

" The species appears to be thoroughly isolated in the genus *Lycæna*, and must take its place in the small group formed by some very heterogeneous species : *L. rhymnus*, Eversmann, *L. tengstræmi*, Erschoff, and *L. anthracias*, Christoph."

"It was on 13th May that I took some very old and worn specimens at an altitude of about 3,500 [feet] on one of the out-jutting spurs of the Tian-Chian."

"The species was flying about a bush which looked like a *Carpinus*, but which was certainly different from that genus."

" It is very probable that my description would be more detailed and more exact if I had some fresher specimens. Out of the twelve specimens which I brought away with me, I could make use of only three for the purpose of description, and even these were not very good." (*Alphéraky*, l. c.)

My knowledge of this species is confined to a single specimen taken by Lieutenant E. Y. Watson on 21st June, 1885, at Gunduk, which is situated in the Sarakola Pass, to the N.-E. of Quetta, Biluchistan. Half of this specimen has been bleached and mounted for examination of the neuration. The figure shows both sides of this specimen, which is in my own collection.

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bunch of fine black hairs arranged compactly at the end of the abdomen as in the female of *Thecla acaciæ*, Fabricius (which occurs in South Europe and Asia Minor), and some other *Lycænidæ*. This most curious feature is found also in *Chætoprocta odata*, Hewitson, described further on in this work. I think it highly probable that *L. tengstræmi* belongs to the genus *Neolycæna*, although Dr. Lang in his " Butterflies of Europe." p. 147, suggests that it should "probably be referred to the genus *Læosopis*, Rambur." In this I think Dr. Lang is wrong. The type and only known species of *Læosopis* is the *L. roboris*, Esper, which is a very different looking insect to *Lycæna tengstræmi*, and is said to differ from the genus *Thecla*, Fabricius, in having smooth instead of hairy eyes, and no tail to the hindwing. As figured by Dr. Lang it has three subcostal nervules to the forewing, while *Thecla* has but two, in this respect differing also from *Neolycæna sinensis* and probably from *N. tengstræmi*.

Genus 108.—LYCÆNA, Fabricius. (Plate XXVI).

Lycæna, sect. 3 (part), Fabricius, Ill. Mag., vol. vi, p. 285, n. 32 (1807) ; id. (part), Boisduval, Gen. et Ind. Meth., p. 10 (1840) ; id., Herrich-Schäffer, Syst. Bearb. Schmett. Eur., vol. i, p. 111 (1843) ; id. (part), Westwood, Gen. Diurn. Lep., vol. ii, p. 488 (1852) ; id. (part), Trimen, Rhop. Af. Aus., p. 233 (1862-66) ; idem, id., South-Afr. Butt., vol. ii, p. 11 (1887) ; *Lycæides*, Hübner, Verz. bek. Schmett., p. 69 (1816) ; *Plebeii*, Linnæus, Syst. Nat., vol. i, pt. 2, p. 744 (1767) ; id., Cuvier, Tabl. Elém., p. 591 (1799) ; *Plebeius*, Kirby, Syn. Cat. Diurn. Lep., p. 653 (1871) ; *Cupido*, sect. B, Schrank, Fauna Boica, vol. ii, pt. 1, pp. 153, 209 (1801) ; id., Kirby, Syn. Cat. Diurn. Lep., p. 345 (1871) ; *Polyommatus* (part). Latreille, Hist. Nat. Crust. Ins., vol. xiv, p. 116 (1805) ; idem, id., Enc. Méth., vol. ix, p. 11 (1819) ; *Rusticus*, Hübner, Tentamen, p. 1 (1806) ; *Scolitantides*, Hübner, Verz. bek. Schmett., p. 68 (1816) ; id., Butler, Cat. Fab. Lep. B. M., p. 167 (1869) ; *Argus*, Boisduval and Leconte, Lep. Am. Sept., p. 113 (1833).

"Body, small, slender, and compressed. Wings, generally large, and of a delicate texture ; in the majority of the species blue on the upperside (at least in the males) and grey or greyish-white beneath, and more or less ocellated, [as restricted by me all the species are ocellated] ; the majority having a small black transverse spot at the extremity of the discoidal cell of the forewing [all the Indian species have this spot on the underside]. Head, small, hairy, the hairs often forming a small tuft on the forehead ; *eyes* moderate-sized, naked ; *palpi* moderately elongated, compressed, scaly ; the middle joint also furnished beneath with detached bristly hairs ; terminal joint shorter than half the length of the second joint, and scarcely varying in length in the opposite sexes, slender, nearly naked, acute at the tip ; *antennæ* of moderate length, very slender, with long joints ringed with white, the club distinct, suddenly-formed, oblong-ovate, depressed, and sometimes spoon-shaped in dried specimens, the joints of the club very short. Forewing, generally elongate, subtriangularly ovate, with the *costal margin* moderately arched, *outer* margin always more or less convex, *inner* margin rather short ; *costal nervure* short, *subcostal* nervure wide apart from the costa, with two branches preceding the extremity of the discoidal cell, and with a third short branch about [less than] half-way between the cell and the tip of the wing ; *discoidal cell* closed by extremely slender middle and lower disco-cellular nervules, which are transverse, the latter uniting with the third median nervule at a moderate distance beyond its origin ; *upper disco-cellular nervule* very oblique, or almost longitudinal, forming, in fact, the base of the upper discoidal nervule." Hindwing, elongate-ovate, entire ; *costal margin* straight, *apex* rounded, *outer margin* very convex, *anal angle* rounded, *abdominal margin* nearly straight ; *costal nervure* extending to apex of wing, first *subcostal nervule* given off some distance before apex of discoidal cell, *disco-cellular* nervules very concave, of about equal length, the *upper* disco-cellular outwardly, and the *inner* disco-cellular inwardly oblique ; *discoidal* nervule from their point of junction, *discoidal cell* very short, much less than half the length of the wing, *second median* nervule originating just before the end of the cell. "Forelegs, of the *male* slender, *tibia* in most species terminated by a short curved horny point ; in others simple ; *tarsus* slender, exarticulate, elongate, slightly curved and attenuated at the tip, which is terminated by a horny curved point, and armed beneath with short spines. Of the *female* similar in size and shape to those of the male, except that the *tarsus* is articulated and unguiculated like those of the four hindlegs. Hindlegs, short, slender."

"Larva, onisciform, gibbo-scutate or oblongo-scutate, with the head and feet small and scarcely perceptible ; the body laciniate, and the back convex and generally beautifully coloured. Pupa, oblong, very convex, smooth, obtuse at each end, and marked with obscure spots ; in a few species armed with short acute tubercles." (*Westwood*, l. c.)

The above diagnosis of the genus *Lycæna* follows generally that given by Westwood in the "Genera," but it has been modified somewhat so as to suit the genus as now restricted in this work, and so as to exclude species which are now referred to several separate genera established in late years.

With reference to the synonymy of this genus, it will be noted that the *Plebeii* of Linnæus is the oldest name used for it. Mr. Kirby in the later portion of his "Synonymic Catalogue of Diurnal Lepidoptera" gives the singular form to the word and uses it for the genus. As

Linnæus used the names *Plebeii*, *Nymphales*, &c., in a divisional sense, I agree with Mr. Scudder (Historical Sketch of the Generic Names proposed for Butterflies, in the Proc. Am. Acad. of Arts and Sciences, vol. x, p. 93), that those names cannot be used in a generic sense. I also prefer to retain the well-known name *Lycæna* for this group of butterflies, which is the reason why I do not adopt Schrank's name *Cupido* for it, though the latter has six years' priority over the former. *Cupido* is used by Mr. Butler for the species here placed in *Lycæna* in his later writings, while at the present day many German writers adopt *Plebeius* in the sense proposed by Mr. Kirby.

The genus *Lycæna*, as formerly established, is one of the largest in the family, and indeed amongst butterflies. When Professor Westwood dealt with it in 1852 he enumerated 199 species (of which about 40 were recorded from Indian limits), and included many which have since been placed in separate genera by subsequent authors. Mr. Kirby in his genus *Plebeius*, equivalent to Westwood's *Lycæna*, enumerated 420 species in 1877. As lately as 1887 Mr. R. Trimen also in his "South African Butterflies" placed in the genus *Lycæna* many species which I have separated from it, as he finds that, if structural characters are alone considered and used in a generic sense, it separates species which in their coloration, pattern of markings, and general appearance are allied superficially; thus, if a tail to the hindwing is taken as a generic character, this places in juxtaposition most dissimilarly-marked species, and, similarly, if the presence or absence of a third subcostal nervule, the anastomosis of the first subcostal nervule with the costal nervure, or the complete separation of these veins, naked or hairy eyes, or variations in the structure of the legs, be adopted as a basis for classifying these insects, the result is found to be equally unnatural and unsatisfactory: in fact he had to fall back upon an arrangement based upon the coloration and pattern of the wings. Although I have not followed this course exactly, I have endeavoured to form a really natural group by restricting *Lycæna* to species with smooth eyes, no tail to the hindwing, and a certain well-marked general appearance. Of course other genera also have smooth eyes and a tailless hindwing, but their type of coloration and markings is different; and the genus as adopted in this work contains a very distinct series of "blues" naturally and closely allied.

As restricted by me, the genus *Lycæna* occurs within our limits almost exclusively in the Western Himalayas and the countries to the north and west, and contains about twenty-four species. *Lycænæ* of the same *facies* as the Indian species occur throughout the Palæarctic region, and are particularly abundant in the European Alps. If the genus is considered in its unrestricted sense, *i.e.*, as including species which I place in the genera *Megisba*, *Neolycæna*, *Chilades*, *Cyaniris*, *Zizera*, *Azanus*, *Orthomiella*, *Talicada*, *Everes*, *Nacaduba*, *Jamides*, *Lampides*, *Catochrysops*, *Tarucas*, *Castalius*, *Polyommatus*, and others, it may be said to occur throughout the world, and in 1877, the date of the Supplement to Kirby's "Synonymic Catalogue," contained over four hundred species, to which many have been since added. With the one exception of *L. medon*, Hufnagel, all the Indian species of *Lycæna* are more or less blue on the upperside in the male, though the coloration of *L. jaloka*, Moore, *L. ellisi*, Marshall, and *L. leela*, mihi, is rather green than blue. The females are usually black or smoky brown on the upperside, some species have more or less blue towards the base of the wings. The colour of the ground on the underside of both sexes is usually pale brown, grey, or white, but in one small group the underside of the hindwing and the apex of the forewing is a beautiful metallic green, very similar to *Chrysophanus kasyapa*, Moore; and it is remarkable that these groups of the two genera appear to be confined to India and the adjoining countries to the north-west. The late Mr. H. Pryer, in his "Rhopalocera Nihonica," has described and figured a "blue" which may be distantly related to this group, with the underside of the hindwing shining green, but this colour does not extend to the apex of the forewing, as it often does in *L. galathea*, Blanchard, and allies. He called it *Lycæna (?) ogasawaraensis*. It occurs in the Ogasawara islands, off the coast of Japan. It has very long antennæ, considerably longer than half the length of the costa of the forewing. All the species of the genus have a spot closing the cell and a discal series of spots to both wings, and many species

have also some marginal series of spots; and three or four spots arranged in a subbasal series on the hindwing. These spots are usually black encircled with white, but in a few species are entirely white. The cilia are almost always long, pure white, and prominent, in only two Indian species is it spotted with black. The *Lycænæ* frequent open ground almost entirely, settling on turf and on the flowers and foliage of low herbage, not a single species, as far as I know, frequenting trees or bushes. In India but few species occur on the outer ranges of the Himalayas, by far the greater number being to be found on the inner ranges and in Kashmir. To render identification easier, I have placed a few remarks before each group.

Key to the Indian species of Lycæna.

A. Both sexes, upperside, both wings smoky-brown without any trace of blue, usually with a series of marginal red lunules.

647. L. MEDON, parts of Europe, North Africa, parts of Asia, Western Himalayas.

B. Male, upperside, both wings blue, never with marginal red lunules.

a. Both sexes, underside, hindwing never with prominent series of orange lunules; cilia of both wings not prominently spotted with black.

*a*¹. Both sexes, underside, hindwing, ground-colour greyish or brownish.

*a*². Both sexes, underside, hindwing, spots black, ringed with white.

*a*³. Male, upperside, both wings with blue coloration confined to the basal two-thirds; cilia of both wings obscurely spotted with black.

648. L. DRVANICA, Ladak.

*b*³. Male, upperside, both wings with blue coloration extending to near outer margin; cilia of both wings entirely white.

*a*⁴. Both sexes, underside, hindwing with marginal spots never sprinkled with metallic green scales.

*a*⁵. Male, upperside, both wings violet-blue.

*a*⁶. Both sexes, underside, hindwing with a white discal streak.

649. L. ARIANA, Western Himalayas.
650. L. STOLICZKANA, Ladak.
651. L. SUTLEJA, Kangra district, Kashmir.

*b*⁶. Both sexes, underside, hindwing without a white discal streak.

*a*⁷. Discal spots on underside of forewing small.

*a*⁸. Underside with marginal orange spots inconspicuous or obsolete.

652. L. FUGITIVA, Biluchistan.
653. L. PERSICA, Afghanistan, Persia.
654. L. KASHGHARENSIS, Kashghar.

*b*⁸. Underside with marginal orange spots prominent.

655. L. YARKUNDENSIS, Yarkand.

*b*⁷. Discal spots on underside of forewing large.

656. L. NADIRA, Kabul.

*b*⁵. Male, upperside, both wings smalt-blue.

657. L. BILUCHA, Biluchistan.
658. L. PSEUDEROS, Kashmir.

*b*⁴. Both sexes, underside, hindwing with marginal spots sprinkled with metallic green scales.

*a*⁵. Underside, hindwing with a complete series of marginal black spots sprinkled with metallic greenish scales.

*a*⁶. Male, upperside, both wings bright dark blue; cilia very broad and pure white.

659. L. BRACTEATA, Afghanistan.

*b*⁶. Male, upperside, both wings pale lavender-blue; cilia narrow and grey.

660. L. SAMUDRA, Ladak, Baltistan.

*b*⁵. Underside, hindwing with two or three anal black spots only sprinkled with metallic greenish scales

a^6. Of small size ; male, upperside lavender-blue.

661. L. CHAMANICA, Biluchistan.

b^6. Of larger size ; male, upperside smalt blue.

662. L. LOEWII, Taurus, Biluchistan.

b^2. Male, underside, hindwing, spots entirely white, female unknown.

663. L. LEHANA, Ladak.

664. L. PHERETES, var. ASIATICA, Native Sikkim.

b^1. Both sexes, underside, hindwing, ground-colour metallic greenish.

a^2. Male, upperside, blue coloration extending to outer margin.

665. L. GALATHEA, Western Himalayas.

b^2. Male, upperside, blue coloration confined to basal two-thirds of wings.

a^3. Male, of small size, blue coloration of upperside inclined to greenish, shining.

666. L. METALLICA, Lahoul, Ladak.

b^3. Male, of larger size, blue coloration of upperside inclined to purple, dull.

667. L. OMPHISSA, Ladak.

b. Both sexes, underside, hindwing with prominent series of orange lunules ; cilia of both wings prominently spotted with black.

668. L. HYLAS, Europe, Western Asia, Afghanistan, Western Himalayas.

C. Both sexes above fuscous, irrorated with metallic greenish scales at base.

a. Both sexes, underside, hindwing with no regular discal series of white spots.

669. L. JALOKA, Kashmir.

b. Both sexes, underside, hindwing with a discal series of white spots.

a^1. Both sexes, underside, forewing with discal spots entirely white.

670. L. ELLISI, Pangi.

b^1. Both sexes, underside, forewing with discal spots white, prominently centred with black.

671. L. LEELA, Ladak.

The first group consists of a single species only, *L. medon*, Hufnagel, which has a wide range in the old world. Both sexes are dark smoky brown on the upperside, forewing with a black disco-cellular spot, both wings with a submarginal series of orange lunules, often more or less absent. Underside, both wings pale brown, usually with the orange spots very prominent, the rest of the markings black surrounded with white ; discal white streak on the hindwing not prominent ; sexes alike.

647. **Lycæna medon,** Hufnagel.

Papilio medon, Hufnagel, Berl. Mag., vol. ii, p. 78, n. 41 (1766) ; id., Rottenburg, Naturf., vol. vi, p. 10; (1775) ; id., Esper, Schmett., vol. i, pt. 1, pl. xxxii, fig. 1 (1778) ; pt. 2, pl. lv, fig. 7 (1780) ; *Papilio agestis*, Wien. Verz., p. 184, n. 13 (1776) ; id., Hübner, Eur. Schmett., vol. i, figs. 303—306 (1798—1803) ; *Polyommatus agestis*, Godart, Enc. Méth., vol. ix, p. 689, n. 220 (1823) ; *Papilio astrarche*, Bergsträsser, Nomencl., vol. iii, p. 4, pl. xlix, figs. 7, 8 (1779) ; *Lycæna astrarche*, Staudinger, Hor. Soc. Ent. Ross., vol. xiv, p. 240 (1878) ; id., Elwes, Proc. Zool. Soc. Lond., 1881, p. 889 ; id., Lang, Butt. Eur., p. 114, n. 21, pl. xxiv, fig. 9, *male* and *female* (1884) ; id., Alphéraky, Hor. Soc. Ent. Ross., vol. xvi, p. 386, n. 42 (1881) ; id. Doherty, Journ. A. S. B., vol. lv, pt. 2, p. 133, n. 180 (1886) ; *Papilio idas*, Lewin, Ins. Brit., vol. i, p. 82, pl. xxxix, figs. 1, 2 (1795) ; *Papilio allous*, Hübner, Eur. Schmett., vol. i, figs. 988—992 (1827—1841) ; *Lycæna astrarche*, var. *a*, *allous*, Lang, Butt. Eur., p. 115 (1884) ; *Polyommatus nazira*, Moore, Proc. Zool. Soc. Lond., 1865, p. 504, n. 102, pl. xxxi, fig. 4 ; *Lycæna nazira*, id., l. c., 1882, p. 246 ; *Cupido nazira*, Butler, l. c., 1886, p. 368, n. 49.

HABITAT : Throughout Europe, except the Polar regions ; North Africa (*Lang*) ; Asia Minor (*Staudinger*) ; Kouldja (*Alphéraky*) ; Askold, Amurland (*Elwes*) ; Western Himalayas.

EXPANSE : ·9 to 1·3 (Indian specimens).

DESCRIPTION : MALE and FEMALE. "UPPERSIDE, *both wings* satin-brown ; a marginal series of blackish dots, bordered inwardly with a submarginal row of deep red lunules. *Forewing* with a black spot closing the discoidal cell. UNDERSIDE, *both wings* purplish cream-colour ; with a submarginal red band, bordered exteriorly with black dots, internally with blackish lunules, and margined on both sides with white lunules. *Forewing* with a spot closing the cell, five and a germinated sixth irregularly across the disc. *Hindwing* with eight spots also irregularly across the disc, three basal and one closing the cell black, each encircled with white ; a dash of white longitudinally on the disc. *Cilia* broad, white, with black spots." (*Moore*, l. c.)

The above description is that given by Mr. Moore in 1865 of a series of specimens taken in Kunawar by Colonel A. M. Lang, R.E., and described as a new species under the name of *P. nazira*. As, however, the Kunawar insects differ in no respect from the European *L. medon*, and from others of the same species occurring elsewhere in the Himalayas and neighbouring mountains, the name of *nazira* cannot be retained, and *medon* will include all the insects of this type within our limits.

"Larva, pale green, with a brownish-purple medio-dorsal stripe and faint pale lateral stripes; each segment has two small wart-like eminences with projecting white bristles. The ventral surface is pale green, with whitish bristles. The claspers are semi-transparent and pale yellow in colour; the legs are spotted with black. The larva when full grown is about half an inch in length, and has the usual *Lycæna* shape. Its food-plant is the stork-bill (*Erodium cicutarium*). Pupa, has the usual *Lycæna* form, pale yellow in colour, with a green tinge, with a dorsal stripe of reddish-purple. It is spun up among the dry leaves of *Erodium* and *Artemisia*." (*Lang*, l. c.) An interesting account by the late Professor P. C. Zeller of the transformations of this species will be found in the Ent. Month. Mag., vol. iv, p. 73 (1867); also still fuller details by the late William Buckler in "The Larvæ of the British Butterflies and Moths," vol. i, pp. 116, 121, pl. xvi, figs. 1, *1a—g* (1886). Mr. Buckler fed the larvæ on *Helianthemum vulgare*.

This species is almost always referred to by modern writers under its synonymic name *astrarche*, Bergsträsser, but I follow Mr. Kirby in so far as to give *medon* the preference, though in his "Synonymic Catalogue" he gives *alexis*, variety 1 of Scopoli (1763), as the oldest name of this species. As, however, *alexis*, Scopoli, is by some authors used as the name for the "Common Blue" of England, and as *icarus*, Rottenburg, which Mr. Kirby says is the older name for the latter species, is not universally adopted for that species, I prefer to take the second oldest name for it; especially as 'var. 1 of *alexis*' and not actually '*alexis*' is the name as strictly applied to our *medon* by Scopoli in 1763.

L. medon is unique amongst the Indian species of the genus in being similarly marked in both sexes, and having no trace of blue coloration on the upperside. The female differs from the male only in having the marginal series of red spots usually larger and more prominent, the apex of the forewing more rounded, and the wings rather broader. The ground-colour of he underside in the female appears to be much darker than in the male. It may be known from the females of the *ariana* group, which usually have no blue above, by its smaller size. As regards its variations, I have taken in Simla specimens with no red spots whatever on the upperside, this variety being the *allous* of Hübner, which Dr. Lang (l. c.) says occurs "as a varietal form of the summer brood [of *L. medon*] in Central and Southern Europe and North Africa." Alphéraky also records this aberration from Kouldja and the Tian-Chian, in Western China. I have also taken specimens in Simla with a few red spots only on the hindwing, none on the forewing, and others with a complete series on the hindwing and three, four, five, and the full number of six on the forewing. Another variety, *salmacis*, Stephens, which occurs only in the British Isles, has no orange band on the forewing in the male above, the black spots of the underside very small, and a white discoidal spot on the upperside of the forewing in the female. Still another variety, *artaxerxes*, Fabricius, occurs only in Scotland, and often has no orange bands above in the male, and a white discoidal spot on the upperside of the forewing in both sexes. In India, *C. medon* occurs in the Western Himalayas on both the outer and inner ranges, and in Kashmir and Ladak, also as far east as Kumaon, which is perhaps its eastern limit, where Colonel Lang states that it is "not common in Naini Tal; occurring from 5,600 feet to the top of Cheena, 8,600 feet." Mr. Doherty also records it from Naini Tal and Dhankuri, Kumaon, 6,000 to 10,000 feet.

The second group has the males more or less blue on the upperside, the females brown, sometimes with irrorated blue scales at the base of the wings. The underside of both sexes in all the species is greyish-brown or greyish, with black spots surrounded with white; in a few species there is a prominent white discal streak on the hindwing. The first species,

L. devanica, Moore, has the blue coloration of the male confined to the basal area of the wings, the underside is darker than in any other species of the group. So far it has been found in Ladak only. The second species, *L. ariana,* Moore, is much larger than any which follow except *L. kashgharensis,* Moore, and *L. yarkundensis,* Moore, from both of which it may be at once distinguished by the prominent white discal streak on the underside of the hindwing. The male is a beautiful bright blue—very like the English *L. adonis* (=*bellargus*)—on the upperside, with a narrow black border and broad white cilia, the underside grey, sprinkled with greenish scales at the base, the markings less prominent than in *L. devanica.* It is one of the commonest species of the genus, occurring on the outer ranges of the Himalayas at Murree, Dalhousie, and Naini Tal, but, strangely enough, not at the intermediate stations Simla and Masuri. It is very common in Kashmir and in many parts of Ladak and the neighbouring countries. The third species, *L. stoliczkana,* Felder, if I have identified it correctly, is merely a dwarfed form of *L. ariana* occurring in the dry country of Ladak. The fourth species, *L. sutleja,* Moore, is probably nothing but *L. ariana,* and occurs in the localities where that species is certainly met with. *L. fugitiva,* Butler, is of small size, the discal white streak on the underside of the hindwing is absent, and all the markings very small and compact; it occurs in Biluchistan and Afghanistan, where I believe none of the previously mentioned species occur. The sixth species, *L. persica,* Butler, occurs in Persia, Afghanistan, and Biluchistan. It is probably not separable from *L. fugitiva,* though the male on the upperside has the anteciliary black line less prominent, and the cilia apparently shorter than in that species. The seventh species, *L. kashgharensis,* Moore, is of the size and colouring of *L. ariana,* but all the markings of the underside are very small and obscure, and there is no white streak to the hindwing. It hardly occurs within our region; the type specimen is from Kashghar. The eighth species, *L. yarkundensis,* Moore, agrees with the preceding species in size, but is differently marked both above and below; it also does not occur in strictly Indian limits. The ninth species, *L. nadira,* Moore, has the spots on the underside of the forewing very large; it is a small insect, the female only is known; it comes from Kabul. The tenth species, *L. bilucha,* Moore, differs in the colour of the upperside in the male from any of the previously mentioned species; it is described as cobalt-blue, but smalt-blue would be a better description; it has no white streak on the hindwing below. It occurs in Biluchistan. The eleventh species, *L. pseuderos,* Moore, is probably very close to *L. bilucha,* and from the description I cannot distinguish between them. It occurs in Kashmir.

648. **Lycæna devanica,** Moore.

Polyommatus devanica, Moore, Proc. Zool. Soc. Lond., 1874, p. 573, pl. lxvi, fig. 4, *male.*

HABITAT: Dras Valley, Ladak.

EXPANSE: ♂, 1·25 to 1·55; ♀, 1·00 to 1·45 inches.

DESCRIPTION: "Allied to *P.* [=*L.*] *alexis,* Scopoli [which occurs throughout Europe, in Northern and Western Asia, and in North Africa, and is sometimes known under the name of *L. icarus,* Rottenburg] MALE. UPPERSIDE, *both wings* dark purplish-blue, basally dashed with clear blue; disco-cellular black spot of underside visible above. *Cilia* white, alternating with brown. UNDERSIDE, *both wings* pale fawn-colour. *Forewing* with a white-bordered prominent black disco-cellular spot and a transverse discal row of five spots; a marginal row of white rings with dark centres, the space between which and the discal spots clouded with black. *Hindwing* with four prominent white-bordered black subbasal spots, and a discal series of seven spots, the five lower spots being disposed in a straight row, the two upper spots proceeding at right angles to anterior margin; a marginal row of pale-bordered dark spots surmounted by a submarginal black lunular line, the lower marginal spots slightly bordered with orange and speckled with metallic-green; a triangular disco-cellular white spot centred with a slight black dentate mark; space between the discal and submarginal spots streaked with white." (*Moore,* l. c.) FEMALE. UPPERSIDE, *both wings* with the blue coloration confined to the immediate base of the wing, otherwise as in the male.

This is a very distinct species and cannot be mistaken for any hitherto recorded from Indian limits. In the male the blue coloration is very dusky and confined to the basal two-thirds of the wings on the upperside, the black disco-cellular spot on the forewing being very prominent. The dark colour of the ground on the underside is also very distinctive. It is also remarkable for having the anal black spots on the underside of the hindwing sprinkled with metallic greenish scales, a feature of the fourth group, and the cilia spotted with black, as in one other Indian species only, *L. hylas*, Wiener Verzeichniss, which comes into my sixth group. I have taken this species on two occasions very commonly in the Dras Valley, Ladak, in the beginning of July, and as far as I know the species is confined to this valley. Mr. H. J. Elwes informs me that *L. devanica* is nearest to *L. phryxis*, Staudinger, MS., described by Dr. Lang in his "Butterflies of Europe," p. 372. It occurs at Samarkand in Turkestan.

649. **Lycæna ariana,** Moore.

Polyommatus ariana, Moore, Proc. Zool. Soc. Lond., 1865, p. 504, n. 103, pl. xxxi, fig. 2, *male*; idem, id., l. c., 1874, p. 271, n. 65; idem, id., Scien. Res. Second Yarkand Mission, Lep., p. 6, n. 22 (1879); *Lycæna ariana*, id., Proc. Zool. Soc. Lond., 1882, p. 246; id., Doherty, Journ. A. S. B., vol. lv, pt. 2, p. 133, n. 179 (1886); *Cupido ariana*, Butler, Proc. Zool. Soc. Lond., 1886, p. 368, n. 48; idem, id., Ann. and Mag. of Nat. Hist., sixth series, vol. i, p. 149, n. 55 (1888).

HABITAT: Kunawar; Mataian, Dras Valley (11,200 feet); Leh; Kashmir (*Moore*); Murree, August and September; Thundiani, August and September (*Butler*); Naini Tal, 4,000 to 8,000 feet (*Doherty*).

EXPANSE: ♂, 1·2 to 1·6; ♀, 1·1 to 1·6 inches.

DESCRIPTION: "MALE. UPPERSIDE, *both wings* brilliant blue. *Hindwing* with the anterior margin black, inner margin whitish. *Cilia* broad, white. UNDERSIDE, *both wings* purple-grey. *Hindwing* suffused with metallic greenish-grey at base. *Forewing* with a small spot within discoidal cell [often wanting], another closing the cell; a submarginal discal series of six spots (the posterior, sixth, geminated), black, each encircled with white; a marginal series of ill-defined double whitish spots, the posterior having slight dark centres. *Hindwing* with two basal and a submarginal discal series of seven black spots encircled with white; a marginal row of whitish spots, each centred exteriorly with a dark, and interiorly with a reddish spot; a triangular spot in the middle of the wing, and a streak from middle of exterior margin, whitish. *Body* white. FEMALE. UPPERSIDE, *both wings* duller lilac-blue, with the exterior margins brownish. UNDERSIDE as in male." (*Moore*, l. c.)

"An abundant species, frequenting pasture- and meadow-land in the summer months, at altitudes of 8,000 to 10,000 feet, alighting on the gentians which stud the green turf." (*Note by Colonel A. M. Lang, R.E.*)

"The female appears to vary almost as much as in *C. icarus* of Europe." (*Butler*, l. c. in Ann. and Mag. of Nat. Hist.)

L. ariana is the commonest and most widely distributed species of the genus in India, occurring to the eastwards as far as Naini Tal at any rate, and to the westwards throughout Kashmir, Ladak, and Baltistan. Both sexes are variable; the male, as described by Mr. Moore from Kunawar, has on the upperside of both wings no outer black border; this is so also in some specimens which I have from Chini and parts of Kashmir; in others moreover from Pangi, Lahoul, some parts of Kashmir, and Ladak, there is a distinct black border, which is very variable in width; in one Pangi specimen, in which it is at its maximum, it is over one-tenth of an inch wide. The underside of the male varies in the shade of the ground-colour, some specimens being much darker than others, in the prominence of all the markings, and in the total absence in some examples of the marginal reddish spots. The female too is very variable; most frequently the upperside is entirely smoky brown with no trace of blue coloration; sometimes there is a complete series of six orange marginal spots on the hindwing and five on the forewing; these are sometimes almost obsolete, and every gradation occurs between these extremes. The underside is always much darker than in the male, all the

spots are more prominent, usually there is a conspicuous series of submarginal orange spots to both wings, and the discal white streak on the hindwing is frequently less prominent than in the male.

650. Lycæna stoliczkana, Felder.

L. stoliczkana, Felder, Reise Novara, Lep., vol. ii, p. 283, n. 360, pl. xxxv, figs. 10, 11, *male* (1865).

HABITAT: Ladak (*Felder*).

EXPANSE: ♂, 1·25 inches (from figure).

DESCRIPTION: "MALE. UPPERSIDE, *both wings* pale metallic-cyaneous, the external margin fuscous, the *cilia* whitish. UNDERSIDE, *both wings* pale hoary-brownish, at the base (especially in the hindwing) black and powdered with metallic-greenish, a whitish diffused disco-cellular spot, in the forewing divided by a brown litura, in the hindwing connected hindwardly with a whitish vittula, with whitish subcuneate spots before the margin, interrupted in the middle with fuscous spots; on the hindwing the two last but one marked with a minute fulvous spot in each inwardly powdered with black, a striga inwardly hoary-, outwardly blackish-fuscous, and another inwardly somewhat silvery, outwardly hoary-brownish before the cilia. FEMALE. UPPERSIDE, *both wings* pale smoky-fuscous, darker at the base and powdered with bluish. *Hindwing* with whitish external evanescent spots. UNDERSIDE, *both wings* as in the male, but *forewing* with the whitish exterior spots obsolete, more or less dotted with black, and the antemarginal spots of *both wings* adorned inwardly with minute increasing golden-fulvous spots sprinkled with black."

"Very distinct from the allied *L. dorylas*, Wiener Verzeichniss, by the considerably shorter hindwing." (*Felder*, l. c.)

I took several specimens of what appears to be this species at Zara in Ladak at the end of June, 1879. They agree in size exactly with the figure of *L. stoliczkana*. They seem, however, to be but dwarfed specimens of *L. ariana*, Moore, with some specimens of which they agree absolutely, except in size. *L. dorylas*, Wiener Verzeichniss, from the European Alps, appears to me to be precisely similar in coloration and markings to both *L. ariana* and the specimens I identify as *L. stoliczkana*, and just intermediate between them in size. As figured, *L. stoliczkana* appears to be quite unique in this genus, as the markings of the underside are reduced to a disco-cellular spot, and some obscure marginal markings, the prominent discal series of spots to both wings and the basal spots to the hindwing, which are characteristic of all true *Lycænæ*, being entirely wanting in Felder's figure, though present in the specimens I doubtfully identify as *L. stoliczkana*.

651. Lycæna sutleja, Moore.

L. sutleja, Moore, Proc. Zool. Soc. Lond., 1882, p. 246.

HABITAT: Kangra District (*Moore*); Sinde Valley, Kashmir.

EXPANSE: 1·4 inches (*Moore*); 1·1 to 1·2 inches.

DESCRIPTION: "Near to *L. boisduvalii*, Herrich-Schaffer, and to *L. ariana*, Moore. UPPERSIDE, *both wings* darker glossy blue, the marginal band narrower; no dusky streaks ascending the veins. *Hindwing* with the marginal spots less prominent. UNDERSIDE, *both wings* lilacine ochreous-grey, darkest on the hindwing. *Forewing*, markings similar to *L. boisduvalii*, except that the spot within the cell is further from the disco-cellular lunule, this spot being situated inward of the end of the first median nervule; the discal row of spots are more linearly disposed, the marginal spots having their red inner borders more slenderly black-lined. *Hindwing* with a black centre to the disco-cellular lunule; upper discal spots nearer together, thus giving a wider space between the upper one and the basal spot; the red borders to marginal spots are somewhat broader and more slenderly black-streaked." (*Moore*, l. c.)

I possess a male of this species taken by me in the Sinde Valley, Kashmir, in June, 1879, which has been named *L. sutleja* by Mr. Moore. It is smaller than the dimensions given by Mr. Moore for this species, and is very near indeed to *L. stoliczkana*, Felder, differing only, as far as I can see, in the colour of the ground on the underside, which is browner, with the orange lunules on the outer margins, especially on the hindwing, much more prominent. Mr.

Moore makes a point of the black spot in the cell of the forewing on the underside being situated inward of the end of the lower median nervule ; in the specimen he has named for me this is not the case ; it is placed distinctly exterior to the base of the first median nervule. The presence of this spot is of no importance, however, in *L. ariana*, Moore, *L. stoliczkana*, Felder, and other species, as it seems to be as often absent altogether as present.

652. **Lycæna fugitiva,** Butler.

L. fugitiva, Butler, Proc. Zool. Soc. Lond., 1881, p. 606, n. 21 ; idem, id., Ann. and Mag. of Nat. Hist., fifth series, vol. ix, p. 207, n. 8 (1882) ; id., Swinhoe, Trans. Ent. Soc. Lond., 1885, p. 340, n. 19.

HABITAT : Quetta, North Biluchistan, March, April, and May.

EXPANSE : 1·2 inches.

DESCRIPTION : "Intermediate in character between *L. persica*, Butler, and *L. zephyrus*, Frivaldsky, [the latter found in the mountains of Greece, Turkey, Asia Minor and Armenia, according to Dr. Lang] but nearer to the latter. UPPERSIDE of the MALE bright lilacine blue, with a black marginal line ; *cilia* with the basal half grey, the external half white ; of the FEMALE smoky brown, more or less washed with blue towards the base, a submarginal series of small lunate orange spots, outer border broadly blackish. *Cilia* as in the male. UNDERSIDE of *both wings* whity-brown, greyer and paler in the male than in the female ; the black spots arranged exactly as in *L. zephyrus*, but all smaller and with less conspicuously white zones ; the double series of submarginal spots on the *forewing* grey and without connecting orange spots in the male, paler in the female ; submarginal spots on the *hindwing* less distinctly black, the orange spots paler, not relieved by a pure white border as in *L. zephyrus ;* base of the *hindwing* rather more broadly washed with bluish-green." (*Butler*, l. c. in Proc. Zool. Soc. Lond.)

"A female taken at Quetta in May, 1881. It is larger than a female previously received, and more brightly coloured, but agrees in its markings." (*Butler*, l. c. in Ann. and Mag. of Nat. Hist.)

I possess a male specimen named *L. fugitiva*, Butler, by Mr. Moore, taken at Quetta, where it appears to be a common species and occurs from early spring to midsummer. I also possess others taken in October in the Hanna Valley at 6,500 feet elevation. In Colonel Swinhoe's collection is a considerable series of males of this species from Quetta and one from Chaman. He records it from "Chaman, May ; Gwal, May ; Sheerog, June ; Quetta, March to May. Very common." He records *L. persica* from Quetta from April to June, and in August and September, and from Kasian and the Lora Valley in June. These specimens of *L. fugitiva* appear to differ only from the next species, *L. persica*, Butler, in having apparently longer cilia and a more prominent black anteciliary line ; the markings in *L. persica* below are perhaps smaller and the ground-colour paler than in *L. fugitiva*. I think that the dry and bare mountainous regions of Biluchistan and South Afghanistan possess a distinct specialized form of their own of *L. icarus* (= *L. alexis*), distinguished by a much paler, greyer tint below than the more warmly tinted typical form prevailing in Europe, and by the markings below being much smaller and less distinct. It must be remembered, however, that *L. icarus* occurs all over Persia and Turkestan, and I have not seen specimens from these countries, and that they are probably intermediate between European *L. icarus* and *L. fugitiva*. The two forms, *L. fugitiva* and *L. persica*, are extremely closely allied, and if they are really separable may be seasonal broods of one species or of one variety of *L. icarus*. As however they have been accepted as distinct species by such eminent entomologists as Messrs. Moore and Butler and by Colonel Swinhoe, they have been included, with specific rank, in this work. The reader, with the descriptions before him, will judge for himself as to whether he can distribute his specimens, should he have any, into two distinct species.

653. **Lycæna persica,** Butler.

Lycæna icarus, var. *persica*, Bienert, Lep. Ergebn , p. 29 (1870) ; *L. persica*, Butler, Proc. Zool. Soc. Lond., 1880, p. 407, n. 11 ; idem, id., Ann. and Mag. of Nat. Hist., fifth series, vol. ix, p. 207, n. 9 (1882) id., Swinhoe, Trans. Ent Soc. Lond., 1885, p. 340. n. 15.

HABITAT : Kandahar, Biluchistan, Persia,

EXPANSE : ♂, 1·2 ; ♀, 1·3 inches.

DESCRIPTION : "Allied to, but distinct from, *L. icarus*, Rottenburg ; the *cilia* shorter, the *hindwing* more produced at apex. MALE. UNDERSIDE, *both wings* chalky white, all the black spots extremely small, the marginal ocelloid spots scarcely visible, those of the *forewing* showing no trace of orange, those of the *hindwing* with small pale orange lunules along their inner margins. FEMALE with greyish costal border on the UPPERSIDE of the *forewing*, and with the greater part of the wing behind this washed with blue, the *hindwing* broadly washed with blue in the same manner ; the orange submarginal spots well-separated on both *fore-* and *hindwing*. UNDERSIDE, *both wings* whity-brown with all the black spots smaller. *Forewing* with two additional spots towards the base ; the orange on the submarginal spots very pale and restricted. MALE and FEMALE with very little blue or green at the base of the wings on the UNDERSIDE." (*Butler*, l. c.)

"Abundant at Kandahar in April, May and June." (*Roberts*). "Very common at Kandahar in October and November ; also a very large variety taken at Quetta from April to June and in August and September ; and at Kasian and the Lora Valley in June ; fairly common." (*Swinhoe*).

In Colonel Swinhoe's collection is a good series of males of this species from Quetta and Kandahar. See remarks on *L. fugitiva*, Butler, *ante*.

654. Lycæna kashgharensis, Moore.

Polyommatus kashgharensis, Moore, Ann. and Mag. of Nat. Hist., fifth series, vol. i, p. 230 (1878) ; idem, id., Scient. Res. Second Yarkand Mission, Lep., p. 5, n. 19, pl. i, fig. 7, *male* (1879).

HABITAT : Yangihissar (4,320 feet), Yarkand.

EXPANSE : ♂, 1·25 (*Moore*) ; 1·45 inches.

DESCRIPTION : "Allied to *P.* [=*L.*] *semiargus*, Rottenburg. MALE. UPPERSIDE, *both wings* pale blue, with narrow black exterior-marginal line, costal edge white. *Cilia* white, with dark inner border. UNDERSIDE, *both wings* slightly pearly-grey, base of the wings pale metallic green. *Forewing* with a white-bordered black spot in the middle of the cell, and a curved discal series of five spots ; a very indistinct spot at the end of the cell, and a less distinct marginal series of spots. *Hindwing* with three subbasal and a curved discal series of six small white-circled black spots, an indistinct spot at the end of the cell, and a marginal row of spots with slightly ochreous interspaced upper dentated line." (*Moore*, l. c. in Scient. Res. Second Yarkand Mission.)

The type and only known specimen of this species is in the Indian Museum, Calcutta. It appears to be abundantly distinct from all the Indian species of the genus, by reason of the smallness and obscurity of all the markings of the underside combined with its large size ; but, as above stated, the specimen is unique, and it is possible that were a long series obtained it would be found that the size and distinctness of the markings below (which in number, arrangement, and general pattern are those of *L. icarus*) varied so much as to render it impossible to separate *L. kashgharensis* from *L. persica* and *L. fugitiva* and other allied species, subspecies, or varieties from the parent form.

655. Lycæna yarkundensis, Moore.

Polyommatus yarkundensis, Moore, Ann. and Mag. of Nat. Hist., fifth series, vol. i, p. 229 (1878) ; *P. yarkandensis*, id., Scient. Res. Second Yarkand Mission, Lep., p. 6, n. 21, pl. i, fig. 8 (1879).

HABITAT : Yarkand (3,923 feet).

EXPANSE : 1·25 (*Moore*) ; 1·45 inches.

DESCRIPTION : "Allied to *P.* [=*L.*] *icarus*, Rottenburg. UPPERSIDE, *both wings* dark blue, anterior and exterior borders dusky brown. *Forewing* with an indistinct streak at end of the cell. *Hindwing* with a marginal row of rather indistinct ochreous-bordered black spots. *Cilia* cinereous-white. UNDERSIDE, *both wings* ochreous-grey [the base irrorated with pale green scales]. *Forewing* with a white-circled black spot in the middle of the cell, another below it, one at end of the cell, and a curved discal series of seven spots ; a marginal row of indistinct spots bordered above by a dentate line with pale ochreous interspaces.

Hindwing with three white-circled black subbasal spots, and a curved discal series of seven spots; [a triangular white spot divided in the middle by a fine dark line on the disco-cellular nervules]; a marginal row of prominent spots bordered above by a dentate line with ochreous interspaces." (*Moore*, l. c. in Ann. and Mag. of Nat. Hist.)

The type and only known specimen of this species is in the Indian Museum, Calcutta. Mr. Moore does not state its sex; it appears to me to be a female. Its distinctness from *L. icarus* to my mind is extremely doubtful, especially if it be admitted that the presence or absence of blue or green metallic irrorations at the base of the hindwing below, and the obliteration or obsolescence of the discal white streak on that wing are untrustworthy and unsafe characters for specific distinction. Except in the absence of this streak the Indian Museum specimen differs in no respect from many European examples of *L. icarus*. In any case the establishment of a species on a unique specimen so closely resembling older species is to be deprecated.

656. **Lycæna nadira**, Moore.

L. nadira, Moore, Journ. A. S. B., vol. liii, pt. 2, p. 24 (1884).

HABITAT: Kabul.

EXPANSE: ♀, 1·0 inch (*Moore*); 1·15 inches.

DESCRIPTION: "FEMALE. UPPERSIDE, *both wings* dark olivaceous violet-brown. *Hindwing* with a very faint trace of paler marginal lunules. UNDERSIDE, *both wings* pale olivaceous-ochreous. *Forewing* with an olivaceous white-bordered large black linear spot at end of the cell, and a recurved transverse discal row of six spots, a submarginal row of small blackish dentate spots, and a marginal row of linear spots. *Hindwing* with three subbasal olivaceous white-bordered black spots, a lunule at end of the cell, a curved discal row of eight spots, a submarginal row of small blackish dentate spots, and a marginal row of short linear spots. *Cilia* brown, edged with white."

"Quite distinct from *L. fugitiva*, Butler." (*Moore*, l. c.)

The type specimen of this species is in the Indian Museum, Calcutta, and is the only one I have seen. The black pale-encircled spots on the underside of the forewing are arranged thus: the five upper ones form a perfect curve, and including the disco-cellular spot almost a perfect circle (with however a wide gap between this last named spot and the first (costal) spot of the discal series), the sixth spot which is out of the curve being nearer the margin; the fifth spot is the largest. In the hindwing the two lower spots of the discal series are rather larger than the others. It appears certainly very distinct from *L. fugitiva* (and *L. persica*) owing to the wings being shorter and broader and the apex less produced than in those species; and also owing to the large size of the conspicuous black spots below. The fifth spot of the discal series on the forewing is especially large and elongated; but these spots are liable to 'sport' in many species of *Lycænidæ* (notably in the genus *Zizera*, Moore), and too much reliance should not be placed on this peculiarity, especially in the absence of a larger series of this form, which may represent but an occasional sport of a commoner local form.

657. **Lycæna bilucha**, Moore.

L. bilucha, Moore, Journ. A. S. B., vol. liii, pt. 2, p. 24 (1884); id., Swinhoe, Trans. Ent. Soc. Lond., 1885, p. 340, n. 18.

HABITAT: Chaman, S. Biluchistan, April and May; Quetta, May and June.

EXPANSE: ♂, 1·2; ♀, 1·1 inches.

DESCRIPTION: "MALE. UPPERSIDE, *both wings* brilliant, glossy, opalised, lilacine cobalt-blue, the exterior margin with a very slender black border. *Cilia* brown, with a broad white edge. UNDERSIDE, *both wings* pale lilacine ochreous-grey, the base slightly metallic-green. [*Cilia* whitish, with an anteciliary dark fine line.] *Forewing* with a small round white-bordered black spot in the middle of the cell, a prominent streak at the end of the cell, a transverse discal row of seven spots, and a marginal double row of pale brown white-bordered lunules. *Hindwing* with a prominent white-bordered black spot in the middle of the cell, one above it, a less distinct spot below it, and a narrow spot on abdominal margin, a streak at end of the cell, and a discal curved interrupted row of eight spots; a marginal row of white-

bordered narrow black spots, each surmounted by a black-lined reddish lunule." (*Moore*, l. c) FEMALE. UPPERSIDE, *both wings* smoky-brown, with a submarginal series of indistinct orange lunules, enclosing indistinct blackish spots on the hindwing. *Forewing* with a distinct black disco-cellular spot. UNDERSIDE, *both wings* pale ochreous-brown, all the spots as in the male but larger and more prominent, and with a submarginal series of distinct orange lunules. I possess but a single specimen of this sex from Quetta taken the same day as numerous males.

The type of this species is in the Indian Museum, Calcutta. It is extremely near to Alpine specimens of *L. eros*, Ochsenheimer; the male differs in the forewing being rather broader, the outer black margin to both wings on the upperside a trifle less wide and not at all macular on the hindwing; on the underside of the hindwing the discal white streak which is present, but not prominent, in *L. eros*, is entirely absent in *L. bilucha*, and the orange marginal spots are more obscure. The tint of blue on the upperside is also certainly less smalt and more purple than in *L. eros*. I possess numerous specimens taken at Quetta in May and June by Lieut. E. Y. Watson.

658. **Lycæna pseuderos,** Moore.

Polyommatus pseuderos, Moore, Proc. Zool. Soc. Lond., 1879, p. 138.

HABITAT: Sind Valley, Kashmir.

EXPANSE: ♂, 1·1; ♀, 1·2 inches.

DESCRIPTION: "MALE. UPPERSIDE, *both wings* smalt-blue, with somewhat broad greyish-black maculated exterior borders. *Cilia* with a blackish inner line. UNDERSIDE, *both wings* pale ochreous-grey. *Forewing* with a white-circled black dot in middle of the cell, a streak at its end, a discal series of six spots, and a marginal row of less-distinct black spots bordered inwardly by a pale ochreous-red and black lunule. *Hindwing* speckled with green and black at the base; a transverse subbasal series of four white-circled black spots, a curved discal series of seven similar spots, a paler streak at the end of the cell, a very prominent row of marginal spots bordered by an inner ochreous-red and black lunule, and an intervening short longitudinal discal white dash. *Cilia* white. FEMALE. UPPERSIDE, *both wings* brown, with a submarginal series of small ochreous-red lunular spots. UNDERSIDE, *both wings* darker-coloured than male; markings the same."

"Alied to *P.* [=*L.*] *eros*, Ochsenheimer; differing above in having the outer margins more decidedly maculated with greyish-black, and in the forewing beneath having no spots at the base; the discal row of spots also are disposed in a more linear series; and the ochreous-red borders to the marginal spots are less dentated with black on their inner border." (*Moore*, l. c.)

This species is unknown to me, and I have seen nothing in India approaching it except *L. bilucha*, Moore. Though I was all through the Sind Valley, Kashmir, in June, 1879, and again in 1887, I did not come across it; it probably occurs at some other time of the year if it is to be found in that valley at all.

The third group contains but four species, the males of which are blue on the upperside with a narrow outer black border; the undersides are grey, markings prominent, *hindwing with two or three black anal spots, sometimes a complete marginal series, irrorated with metallic green scales*; this feature occurs in both sexes, and is peculiar to this group, and to *L. devanica*, Moore, of the first group, which however can be distinguished from all the species of this group by having the cilia of both wings in both sexes spotted with black instead of being white throughout, and the male having the blue coloration of the upperside confined to the basal two-thirds of the wings instead of nearly reaching to the outer margins. The first species, *L. bracteata*, Butler, is of small size, the coloration of the male on the upperside (if it be, as is said, the same as in *L. argus*, Linnæus) is dark blue, the cilia very broad and pure white; the female has a considerable portion of the basal areas of both wings on the upperside also blue. It occurs in Afghanistan. The second species, *L. samudra*, Moore, is rather larger than *L. bracteata*, the coloration of the male on the upperside is pale

lavender-blue, the cilia much narrower, grey not pure white ; the female is dull smoky black, the blue coloration confined to the bases of the wings. It occurs in Ladak and Baltistan. The third species, *L. chamanica*, Moore, is also small, and may perhaps be known from *L. bracteata* and *L. samudra* by having two anal spots only on the underside of the hindwing sprinkled with metallic-green scales ; in *L. bracteata* and *L. samudra* there is a complete marginal series. The fourth species, *L. loewii*, Zeller, is as a rule considerably larger than the preceding, the coloration of the male on the upperside is smalt-blue, all the markings of the underside particularly prominent. It occurs in Biluchistan as well as in Asia Minor.

659. **Lycæna bracteata**, Butler.

L. bracteata, Butler, Proc. Zool. Soc. Lond., 1880, p. 407, n. 12, pl. xxxix, fig. 4, *male*.

HABITAT : Kandahar.

EXPANSE : ♂, 1·1 ; ♀, 1·1 inches.

DESCRIPTION : "MALE. Allied to *L. argus*, Linnæus, with which it agrees on the upperside. UNDERSIDE, *both wings* considerably paler, with all the black spots much smaller and distinctly white-bordered, the orange spots wholly absent from the *forewing*, and the orange borders of the *hindwing* only represented by small ochreous lunules above the metallic spots, the latter silvery green with black centres instead of margins, extremely small towards the apex, but increasing in size towards the anal angle. FEMALE. UPPERSIDE, *both wings* of a more pinky lilac colour than the male. *Forewing* with a considerably broader, but brown instead of black, border ; a well-defined black disco-cellular stigma. *Hindwing* with brown costal border ; outer margin black, preceded by five or six rounded blackish spots. UNDERSIDE, *both wings* altogether paler than in the male ; but the example is evidently not a fresh one, so that this character may be due to fading."

"The female is utterly unlike that sex of *L. argus* on both surfaces, being in coloration almost like a male insect." (*Butler*, l. c.)

" Found in May, and common in June." (*Roberts.*)

I have not seen a specimen of this species ; it may perhaps be known by having a complete marginal series of metallic green spots on the underside of the hindwing.

I append a description of *L. argus*, Linnæus, with which Mr. Butler compares *L. bracteata*.*

660. **Lycæna samudra**, Moore.

Polyommatus samudra, Moore, Proc. Zool. Soc. Lond., 1874, p. 574, pl. lxvii, fig. 2, *male*.

HABITAT : Gol and Skardo, Baltistan.

EXPANSE : ♂, 1·12 to 1·35 ; ♀, 1·25 to 1·40 inches.

DESCRIPTION : "MALE. UPPERSIDE, *both wings* pale lavender-blue, exterior margins and end of veins slightly fuliginous. *Hindwing* with the anterior border slightly fuliginous, costal edge white, abdominal margin greyish-white. UNDERSIDE, *both wings* greyish-white, slightly greenish at the base of the hindwing. *Forewing* with a discal transverse recurved row of black spots, each with a white border ; a narrow white-bordered black streak at end of the cell, and a submarginal series of blackish lunules. *Hindwing* with a series of eight small white-bordered black spots, two being near anterior margin towards the base, five on the disc, and one on abdominal margin ; a pale-bordered short black streak

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* *Lycæna argus*, Linnæus. *Papilio argus*, Linnæus, Syst. Nat., ed. x, vol. i, pt. 2, p. 483, n. 152 (1758). HABITAT : Greater part of Europe, Asia Minor, and Armenia. EXPANSE : *Male* and *female*, 1·0 to 1·1 inches. DESCRIPTION : "MALE. UPPERSIDE, *both wings* dark blue, nearly the same colour as *L. ægon*, Wiener Verzeichniss, which it altogether greatly resembles ; the hind-marginal border, however, is narrower and more defined, the hind-marginal spots of the hindwing are more distinct, and the white marginal *cilia* are very narrow—not broad, as in *L. ægon*. UNDERSIDE, *both wings*, ground-colour uniform brownish-grey ; the medial row of spots on the *forewing* is more even, the last spot but one from the inner margin being more in a line with the rest, and not, as it were, thrust inwards, as in *L. ægon* ; the silvery spots of the *hindwing* on the hind margin are much more distinct than in *L. ægon*. The anterior tibiæ are not provided with spines. FEMALE. UPPERSIDE, *both wings* almost entirely resemble those of the female of *L. ægon*, but the orange hind-marginal spots are rather more distinct. UNDERSIDE, *both wings*, as in the male." (*Lang*, Butt. of Europe, p. 105, n. 8, p. xxiii, figs. 2, *male* and *female* (1884).

at end and a dot within the cell; a submarginal series of narrow black lunules with inner white borders, and a marginal row of small metallic silvery spots which are slightly bordered within with red. FEMALE. UPPERSIDE, *both wings* differ from the male in being anteriorly and the veins broadly fuliginous. UNDERSIDE, *hindwing* differs from the male in the partial absence of the discal series of spots. *Cilia* white, slightly brown at the ends of the veins. *Antennæ* black, ringed with white." (*Moore*, l. c.)

The only Indian species with which *L. samudra* can be confounded is *L. bracteata*, Butler, a species which I have not seen unfortunately. I have pointed out in the notes on this group (p. 77) how, as far as I know, these two species differ; they occur in quite different localities and are probably quite distinct, though in this genus particularly it is often very difficult in words to define the minute but quite perceptible differences that exist in coloration and markings. *L. samudra* is very close to, if indeed really separable from, *L. christophi*, Staudinger, from Turkestan and Persia.* Mr. H. J. Elwes has sent me a single female specimen of this species, which differs from females of *L. samudra* in being smaller, the upperside is blue not fuliginous, the blue colour in *L. samudra* is almost confined to the base of the wings, in *L. christophi* it occupies nearly the entire surface; the underside of the latter species is rather paler. Both species were described in the same year. *L. samudra* is a common species in Ladak and Baltistan wherever a certain small grey-leaved prickly bush occurs, on which its larva probably feeds.

661. **Lycæna chamanica,** Moore.

L. chamanica, Moore, Journ. A. S. B., vol. liii, pt. 2, p. 23 (1884); id., Swinhoe, Trans. Ent. Soc. Lond., 1885, p. 340, n. 17.

HABITAT: Chaman, S. Biluchistan, April.

EXPANSE: ♂, 1·0 inch.

DESCRIPTION: "MALE [*nec* female]. UPPERSIDE, *both wings* lavender-blue. *Forewing* with the extreme outer margin pale dusky-brown. *Hindwing* with pale dusky-brown costal and marginal border, the latter traversed by an outer row of whitish lunules. UNDERSIDE, *both wings* lilacine ochreous-grey. *Forewing* with a large white-bordered black lunule at end of the cell, a discal transverse row of six spots, and a marginal row of white-bordered dark brown spots, the transverse interspace between the discal and marginal spots also dark brown. *Hindwing* with three straightly-disposed transverse subbasal white-bordered black spots, a lunule at end of the cell, and a curved discal interrupted row of eight spots; a marginal row of rounded dark brown spots, bordered by an inner dark brown lunular line; the anal and penultimate spot is black, specked with metallic-blue scales, and surmounted by orange-yellow. *Cilia* dusky-brown, edged with white."

"This species is quite distinct from *L. bracteata*, Butler." (*Moore*, l. c.) Unfortunately I have not seen the latter species, so am unable to compare one with the other, but they are evidently very closely allied. See remarks on the next species.

The type and only known specimen of this species is in the Indian Museum, Calcutta. It was taken at Chaman, which, though occupied by us, politically, as part of Biluchistan, is really, geographically, in South Afghanistan; being at the western (Afghan) foot of the slopes of the Khojak Amran range, which separates Peshin from the Kandahar provinces. Colonel Swinhoe (l. c.) records this species from "Kandahar, November; Quetta, August and September." I have seen these specimens; they certainly are not *L. chamanica*, but appear to me to be *L. persica*, Butler.

662. **Lycæna loewii,** Zeller. (PLATE XXVI, FIG. 167 ♂).

L. loewii, Zeller, Isis, 1847, p. 9, n. 35; id., Herrich-Schäffer, Schmett. Eur., vol. i, figs. 434-437 (1849); id., Lang, Butt. of Eur., p. 141 (1884); *L. empyrea*, Freyer, Neuere Beitr., vol. vi, pl. dlxxiii, fig. 1 (1852); id., Gerhard, Mon. *Lyc.*, pl. xvii, figs. 2, *a—c* (1853).

HABITAT: Asia Minor; Biluchistan.

EXPANSE: ♂, 1·2 to 1·4; ♀, 1·25 to 1·35 inches.

* *Lycæna christophi*, Staudinger, Stettin Ent. Zeit., vol. xxxv, p. 87 (1874).

DESCRIPTION: MALE. UPPERSIDE, *both wings* brilliant shining light "*adonis*" blue, much the same as in *L. bilucha*, Moore, but a little darker. *Forewing* with the costa very narrowly black, the outer margin broadly black, that colour ascending the veins on to the disc. *Hindwing* with the costal margin broadly fuscous, a distinct anteciliary black line of the same width as the cilia, inwardly defined by a whitish line between the veins, with black spots between the veins placed against the white line, the outer portions of the veins black. UNDERSIDE, *both wings* grey. *Forewing* with a prominent disco-cellular and discal series of six spots, the lower spot often geminated, all deep black, surrounded with a whitish ring; an anteciliary regular black line, then a series of oval black spots surrounded with whitish, beyond this a somewhat broad dark increasing fascia defined on both sides with whitish. *Hindwing* with a small spot on the abdominal margin near the base of the wing, four subbasal spots arranged across the wing nearly in a straight line, an elongated prominent disco-cellular spot, and an irregular discal series of seven spots, all large, black, prominent, and surrounded by a whitish line; a prominent anteciliary even narrow black line; a submarginal series of round black spots between the veins, the large one in the first median interspace, the two conjoined ones in the submedian interspace, and a minute one in the internal interspace on the abdominal margin sprinkled with metallic blue scales, and crowned broadly with orange; between the submarginal and discal series of spots is a lunulated black line. *Cilia* on both wings on both sides long and pure white. FEMALE. UPPERSIDE, *both wings* fuscous. *Forewing* with a submarginal and discal series of whitish spots placed in very regular order between the veins parallel with the outer margin. *Hindwing* with a discal series of whitish lunulated spots and a series of round black spots between the veins near the margin surrounded by a whitish ring, the two divided by the second median nervule the largest, and inwardly broadly crowned with orange. UNDERSIDE, *both wings* as in the male, but the ground-colour is darker, and all the markings are more prominent.

The above description is taken from the most prominently marked specimens out of a long series of this species taken by Lieut. E. Y. Watson at Quetta and Gundak, Biluchistan, the latter place being in the Sarakola Pass, about ten miles to the south-east of Quetta. Colonel Swinhoe also possesses a pair taken at Gundak. All were taken in June. This species was aslo taken by the late Lieut. Harvey, R.E., in June, 1888, on the summit of the Khojak. Other specimens have the blue coloration of the upperside more purple in shade and less "*adonis*-" like, the cilia dusky, and all the markings smaller and less prominent below. There is every gradation between these extremes. Dr. O. Staudinger has separated off a variety of *L. loweii* in his Catalogue of Palæarctic Lepidoptera, and referred to it in his Monograph of Asia Minor Lepidoptera (Hor. Soc. Ent. Ross., vol. xiv, p. 234, 1878), calling it *gigas*; this variety may also occur in Biluchistan. It is briefly described in Lang's Butt. of Eur., p. 371, from the Taurus.

With reference to the preceding species, *L. chamanica*, Moore, I have carefully examined the prehensores, and find that the type specimen is a male, not a female, as stated by Mr. Moore. There is a slight difference between it and *L. loewii* in the shade of blue of the upperside, which is the only character which I can find to separate them. The markings of the underside in this species are very characterstic, they agree exactly in *L. chamanica* and *L. loewii*. They are almost certainly one species.

The figure shows both sides of a male specimen from Quetta in my collection.

The fourth group contains two species only, one of which I have not seen. They may be known from all which precede them by having the spots on the underside of the hindwing white without black centres; this character obtains in the fifth group also, but that group has the ground-colour of the hindwing on the underside metallic green, while *L. lehana*, Moore, and *L. pheretes*, var. *asiatica*, Elwes, have it grey. In the seventh group also the spots of the hindwing on the underside are often white, but on the upperside of the males the wings are fuscous with the base sprinkled with metallic green scales, while in the species of this group the wings are blue. The first species, *L. lehana*, occurs in Ladak, the second species, *L. pheretes*, var. *asiatica*, in Native Sikkim.

663. **Lycæna lehana,** Moore.

Polyommatus lehanus, Moore, Ann. and Mag. of Nat. Hist., fifth series, vol. i, p. 230 (1878); idem, id. Scient. Res. Second Yarkand Mission, Lep., p. 6, n. 20, pl. i, fig. 6, *male* (1879).

HABITAT: Leh (11,538 feet), Ladak.

EXPANSE: ·9 to 1·0 inch.

DESCRIPTION "Allied to *P.* [=*L.*] *pheretes*, Hübner [found in Norway, Sweden, Lapland, the Swiss Alps, Pyrenees, and South Siberia]. MALE. UPPERSIDE, *both wings* violet-blue, somewhat brownish-blue at the margins. *Cilia* white. UNDERSIDE, *both wings* leaden grey, palest at the apex and on the hindwing. *Forewing* with a white-bordered black spot at end of the cell, and a transverse discal oblique series of five spots. *Hindwing* with a large triangular greyish-white spot at end of the cell, and a series of eight small round spots recurving from near base of costa across the disc to anal angle." (*Moore*, l. c. in Ann. and Mag. of Nat. Hist.)

The type of this species, now in the Indian Museum, Calcutta, was taken by the late Dr. F. Stoliczka at Leh on 8th September, 1873. I took another male at Zara, on the Leh Road, Ladak, on 13th July, 1879. These are the only two specimens known. They differ chiefly from *L. pheretes* in their much smaller size, 1·00 inch as against 1·25 inches. The shade of blue on the upperside and the black marginal line being blurred are slight points of difference between the type specimen and *L. pheretes*, but the specimen I took is of precisely the same shade of blue, and the marginal black line is not blurred, though not quite as sharply defined as in *L. pheretes*. The markings of the underside are very similar. It is doubtful if *L. lehana* will ultimately survive as a species distinct from *L. pheretes*.

664. **Lycæna pheretes,** Hübner, var. **asiatica,** Elwes.

L. pheretes, Hübner, var. *asiatica*, Elwes, Proc. Zool. Soc. Lond., 1882, p. 402; idem, id., Trans, Ent. Soc. Lond., 1888, p. 382, n. 225.

HABITAT: Native Sikkim.

EXPANSE: ♂, 1·1 inches.

DESCRIPTION: "MALE and FEMALE. Differs from *L. pheretes*, Hübner, in the narrower and more pointed *forewing*, and in having much more green gloss on the UNDERSIDE."

"I was at first disposed to consider this a new species, but noticing that Dr. Staudinger, in his list of the Lepidoptera of Tarbagatai in Central Asia (Stett. Ent. Zeit., 1881, p. 263), mentions that *L. pheretes*, Hübner, has the same difference of colour there, I do not think the small number of specimens I have received (four females and two males) justify me in separating the species at present, though the difference, if constant, is considerable. I know no *Lycæna* at all like it in the Himalayas, though *L. ellisi*, Marshall, which occurs at high elevations in the N.-W. Himalayas, seems allied to, though very distinct from, it." (*Elwes*, l. c. in Proc. Zool. Soc. Lond.)

"Since writing the above description I have received no more of this form from Sikkim, but have three specimens agreeing with them from Ladak, and also three pairs from Mongolia and Turkestan, which are like the European insect. These confirm my opinion that the Himalayan form of *pheretes* is distinguishable from others by its more pointed forewing and a somewhat deeper shade of blue." (*Elwes*, l. c. in Trans. Ent. Soc. Lond.)

I know nothing of this species but what is given above. It is the only species of the genus that has been recorded east of Kumaon within Indian limits. *L. ellisi* belongs to quite a different group, Mr. Elwes' species being allied to *pheretes* and not to *orbitulus*, Esper, which is the type of the group to which *L. ellisi* belongs. As Mr. Elwes says that his Sikkim specimens agree with Ladak ones, his varietal name *asiatica* will have to make way for Moore's older name *lehana*, but in my opinion neither name will ultimately stand.

The fifth group contains three species, and as far as I know is confined to India. In the males the upperside is more or less blue, the underside of the hindwing metallic-greenish with indistinct white spots, and in this respect differs from all the Indian species of the genus. The

first species, *L. galathea*, Blanchard, has the blue coloration extending nearly up to the margin of the forewing in the male, the margin is narrowly black. The second species, *L. metallica*, Felder, is considerably smaller than *L. galathea*, and has the blue coloration of the upperside of the forewing confined to the basal two-thirds of the wing, leaving a well-defined black border beyond. The third species, *L. omphissa*, Moore, has the blue coloration of the male on the upperside still more confined to the base of the forewing, leaving a black border beyond, but ill-defined ; it is also a larger species than *L. metallica*, and the blue colour is of a much more purple shade and is less shining.

665. Lycæna galathea, Blanchard.

L. galathea, Blanchard, Jacquemont's Voy. dans l'Inde, vol. iv, Zoologie-Insectes, p. 21, n. 17, pl. i Insectes, figs. 5, 6, *male* (1844) ; *Polyommatus galathea*, Moore, Proc. Zool. Soc. Lond., 1874, p. 271, n. 66 ; idem, id., Scien. Res. Second Yarkand Mission, Lep., p. 6, n. 23 (1879) ; *Polyommatus nycula*, Moore, Proc. Zool. Soc. Lond., 1865, p. 503, n. 101, pl. xxxi, fig. 3, *male* ; id., Lang, Ent. Month. Mag., vol. v, p. 37 (1868) ; *Lycæna nycula*, Staudinger, Ex. Schmett., p. 272, pl. xciv, *male* (1888).

HABITAT : Pangi, Kashmir, Kunawar, Kulu, Narkunda.

EXPANSE : ♂, 1·4 (*Blanchard*), 1·3 to 1·6 ; ♀, 1·3 to 1·6 inches.

DESCRIPTION : MALE. "UPPERSIDE, *both wings* deep cerulean blue, with the margin black. UNDERSIDE, *forewing* cincreous with a fascia of black dots circled with white. *Hindwing* pale greenish adorned with white dots."

"This butterfly is of a beautiful azure slightly violaceous-blue on the UPPERSIDE of *both wings*, with a broad black border. *Cilia* white with a single greyish border. UNDERSIDE, *forewing* cinder-grey, darker towards the margins than at the base ; a black spot bordered with white at the end of the discoidal cell, and between this spot and the margin is a transverse series of dots or small spots more or less rounded, black and circled with white ; these spots are six in number. *Hindwing* very pale green, a little coppery, with a small white crescent-spot towards the end of the discoidal cell, and beyond a transverse very sinuous series of small rounded spots, to the number of seven, of a whitish colour, and ill-defined. *Body* covered with bluish-grey hairs on the upperside, with white hairs on the underside." FEMALE. UPPERSIDE, *both wings* smoky black. *Cilia* white. *Forewing* with three increasing quadrate orange spots towards the anal angle. *Hindwing* with three, four or five very large almost quadrate (their anterior ends rounded) orange spots on the outer margin. UNDERSIDE, *forewing* marked like the male, but with two orange spots (the lower one germinated) at the anal angle. *Hindwing* marked like the male. The orange spots on the upperside are larger than in any species of *Lycæna* known to me.

"This *Lycæna* is near to *L. cyllarus*, Fabricius, [? Rottenburg, which occurs in parts of Europe, Northern and Western Asia and Amurland], but can easily be distinguished by the spots on the outer margin of both wings, also by the green coppery colour which is spread over the entire surface of the hindwing. Mr. Jacquemont collected a single male specimen in Kashmir." (*Blanchard*, l. c.)

This very beautiful species is by no means common in Kashmir, where it has been taken by Mr. J. H. Leech and myself in June and July in several places ; Mr. Robert Ellis has taken it in Pangi in considerable numbers in July ; it has been taken by Dr. T. C. Jerdon at Goolmerg in July and August, 1867, and Dr. F. Stoliczka obtained it as late as August 10th at Sonamerg, Kashmir. Mr. Ellis obtained a rather curious aberration at Pangi, in which the blue coloration of the upperside (of a male) is much darker than usual, and is confined to the basal two-thirds of the wings. In many specimens the metallic green of the hindwing on the underside is found on the apex and less broadly on the outer margin of the forewing also. Typical *L. galathea* is confined apparently to the damp richly-wooded portions of Kashmir and the neighbouring states at from 7,000 to 12,000 feet elevation. I am, however, obliged to include *L. nycula*, Moore, with this species, a step which considerably adds to its easterly range : this form has been taken within 40 miles of Simla, and by Mr. P. W. Mackinnon plentifully in

July and August in Tehri Gurhwal. A description of *L. nycula* with my remarks on it is given below. *

666. **Lycæna metallica,** Felder.

L. metallica (*female only*), Felder, Reise Novara, Lep., vol. ii, p. 283, n. 361, pl. xxxv, fig. 9, *male* (*nec* figs. 7 and 8), (1865); id., Moore, Proc. Zool. Soc. Lond., 1882, p. 247.

HABITAT: Lahoul, Ladak.

EXPANSE: ♂, ♀, 1·2 inches.

DESCRIPTION: MALE (*nec* female). "UPPERSIDE, *both wings* hoary-fuscous. *Forewing* with the basal two-thirds, *hindwing* with the interior area metallic bluish. UNDERSIDE, *forewing* more palely hoary-brownish, near the base above the costal nervure bluish-greenish, a narrow disco-cellular spot, and seven others exterior rounded in a bent series blackish-fuscous circled with whitish. *Hindwing* green palely bronzed, with the veins outwardly, and the margin narrowly within the anteciliar line hoary-brownish, the disco-cellular litura and small dots beyond it in an angulated series whitish, badly defined."

"This beautiful insect is most closely allied to *L. cyllarus,* Fabricius." (*Felder,* l. c.)

The above description exactly applies to the males of a species of *Lycæna* of which large series have been taken in Lahoul and Ladak, and of which the female is brown above, and the underside resembles that of the male. As these insects have not been described under any other name, it will be both right and convenient to retain for them the name *metallica* given by Dr. Felder to the male shewn in his figure 9 under the misapprehension that it was the female of an entirely distinct insect, which he also named *metallica,* but which is distinct from his other *metallica,* and which if it be not *L. galathea,* Blanchard, has not apparently been since taken or recorded. It may be accepted as an invariable rule that in this and allied groups the females on the underside resemble the males almost exactly; but in this case the assumed male of Felder's supposed female *metallica* differs considerably on the underside from the insect mated with it. The above description may therefore stand for *metallica* male: while the FEMALE is smoky-black on the UPPERSIDE of *both wings,* the base irrorated more or less with blue scales; no orange markings whatever; the UNDERSIDE of *both wings* as in the male.

I append as a footnote† below Felder's description of the male shewn in the figs. 7 and 8 of his plate xxxv. It may apply to males of the *nycula* form of *L. galathea,* Blanchard In

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* *Lycæna nycula*, Moore. *Polyommatus nycula*, Moore, Proc. Zool. Soc. Lond., 1865, p. 503, n. 101, pl. xxxi, fig. 3, *male*. HABITAT: Kunawur, Kashmir, Narkunda. EXPANSE: *Male*, 1·25 inches (*Moore*), actual measurement of type specimen, 1·4; *male*, 1·25 to 1·60; *female*, 1·3 to 1·6 inches. DESCRIPTION: MALE, "UPPERSIDE, *both wings* dark lilac-blue, *cilia* and inner margin of *hindwing* whitish. UNDERSIDE, *forewing* pale purplish cream-colour, bluish-grey along exterior margin; a spot closing the discoidal cell, and a linear series of five spots medially across the disc, white. *Hindwing* metallic bluish-grey. *Body* white." (*Moore*, l. c.)

"Tbis species is not common. It frequents the beautiful flower-carpeted pasture-lands on mountain-sides in Kunawar, at 11,000 to 12,000 feet—those smiling 'alps' where the villagers drive their herds when the early summer has set in, and tbe melting snow leaves this gay carpet of flowers on spots which for many months had remained hidden beneatb a tbick snowy mantle." (*Note by Colonel A. M. Lang, R.E.*)

The type of this species, a male, labelled by Colonel Lang himself "Kunawar, N.-W. Himalayas," and by Mr. Moore "*Polyommatus nycula*, male (type). Moore," is in the Indian Museum, Calcutta. It differs from typical *L. galathea*, Blanchard, in having all the spots of the forewing on the underside white. There is a similar specimen taken by Mr. A. Grahame Young at 9,000 feet in September also in the Museum. In Colonel Lang's collection there are four males and three females taken by him in "Middle Kunawar (Kazhang Valley, 12,000 feet, 10th July, 1865; Wungur Valley, 11,000 feet"); one male and one female "Upper Kunawar (below Runang pass, 13,000 feet)"; and three males "Narkunda, near Simla, 9,000 feet." These specimens show great variation; in some of them the white spots on the underside of the forewing are immaculate, others are slightly marked with black in the middle, others again are black spots with white outer rings, in fact, are *L. galathea*. In my opinion the two species cannot be separated; there is every gradation between them. The female is exactly like that sex of *L. galathea*; all the four specimens in Colonel Lang's collection have the white spots above-mentioned centred with black. Every variation occurs also in the specimens from Tehri Gurhwal.

† *Lycæna*—(*male* only), Felder, Reise Novara, Lep., vol. ii, p. 283, n. 361, pl. xxxv, figs. 7, 8, *male* (1865). HABITAT: Ladak. EXPANSE: *Male*, 1·3 inches. DESCRIPTION: "MALE. UPPERSIDE, *both wings* dilute violaceous-cyaneous, a whitish striga before the cilia, outwardly powdered with fuscous. *Forewing* with the tips of the veins and the margin increasingly hindward, *hindwing* with the costal border and the external margin fuscous. UNDERSIDE. *Forewing* very pale hoary-brownish, at the base and at the apex, the *hindwing* entirely metallic bluish-greenish. *Forewing* with a rounded spot, *hindwing* with a litura on the disco-cellulars and a bent fascia of rounded spots beyond the disc whitish, broader in the forewing, and in the hindwing joined to a fuscous shadow." (*Felder*, l. c.) It may be noted that in the text Dr. Felder does not refer at all to his fig. 9, which I have taken as typical of the species.

any case it applies to insects distinct from those shewn in his figure 9, which I here retain as *metallica*: and if hereafter his figs. 7 and 8 are proved to denote a distinct species, it will need to be renamed.

I possess seventeen males and five females of *L. metallica* taken in the Chandra Valley, Lahoul, at 10,300, 10,400, 10,500, 11,000, and 11,300 feet at different dates in July and August by Mr. A. Grahame Young; and at Sakti village, south side of the Chang La, Ladak, 13,000 feet, in July, by Mr. R. D. Oldham. *L. metallica* may be known from *L. galathea*, Blanchard, and *L. omphissa*, Moore, by its uniformly smaller size; the male on the upperside having the blue coloration of a different shade, being bluish-green, the forewing with the blue area sharply defined, leaving the outer third of the wing black, the veins crossing the blue area also black.

667. **Lycæna omphissa**, Moore.

Polyommatus omphissa, Moore, Proc. Zool. Soc. Lond., 1874, p. 573, pl. lxvi, fig. 2, *male*.

HABITAT: Dras Valley, Ladak.

EXPANSE: ♂, 1·2 to 1·5; ♀, 1·25 to 1·40 inches.

DESCRIPTION: "Allied to *P.* [=*L.*] *galathea*, Blanchard. MALE. UPPERSIDE, *both wings* very dark purple, the base only suffused with blue. UNDERSIDE, *forewing* pale greyish fawn-colour, disc suffused with fuliginous, a prominent disco-cellular white-bordered black streak and transverse discal row of six spots. *Hindwing* metallic golden green, a distinct white disco-cellular spot, and angular discal series of white spots. FEMALE. UPPERSIDE, *both wings* glossy vinous purple, with indistinct dull orange marginal spots. *Cilia* white, with brown inner line." Otherwise as in the male. (*Moore*, l. c.)

This is a very distinct species, and separable at a glance from *L. galathea*; in the male the blue of the upperside is of a much deeper shade and restricted to the base of the wing. The markings of the underside do not differ. The female may be known by the marginal orange spots of the upperside being obsolete, instead of large and prominent. It is very near to *L. metallica*, Felder; the males can be distinguished by their larger size, the more restricted blue area of the upperside, and the purplish tinge of the blue, which is greenish in *L. metallica*. The females of the two species are exactly alike. I took numerous specimens in the Dras Valley, Ladak, in June, 1879 and 1887.

The sixth group contains but a single species in India, which, according to Mr. Butler, belongs to the genus *Scolitantides*, Hübner, all the species of which "have a peculiar type of coloration, the fringe of the wings being alternated with black and white, and the spots of the under surface large and black."* Dr. Lang gives three species of this group as occurring in Europe, *L. bavius*, Eversmann, which is found in South Russia, Asia Minor, and Syria; *L. orion*, Pallas, which occurs in Central and Southern Europe, Asia Minor, Armenia, South Siberia, and Amurland, and is a larger and much darker species than the third species, *L. hylas*, Wiener Verzeichniss, which occurs in Central and South-Eastern Europe, and Western Asia, including Kashmir and Ladak. On the upperside the male is greyish-blue; on the underside white, the black spots very prominent, and the two marginal series on the hindwing enclosing a series of orange lunules. The female is smoky-black on the upperside, the base of the wings irrorated with purplish scales, and with a distinct disco-cellular black spot on the forewing, and indistinct marginal lunules on the hindwing, sometimes with the orange band below showing through obscurely; the underside is like the male. The prominence of the black-spotting of the cilia is a marked characteristic of this group, and is only found slightly in *L. medon*, Hufnagel, and *L. devanica*, Moore, of the first and second groups.

668. **Lycæna hylas**, Wiener Verzeichniss.

Papilio hylas,† Wiener Verzeichniss, p. 185, n. 16 (1776); id., Hübner, Eur. Schmett., vol. i, figs. 325—327 (1798-1803); *Polyommatus hylas*, Godart, Enc. Méth., vol. ix, p. 687, n. 216 (1823); *Papilio hylus*, Fabricius,

* Butler, Cat. Fab. Lep. B. M., p. 167 (1869).

† Dr. Lang in his "Butterflies of Europe" calls this species by Bergsträsser's name *baton*, but I follow Mr. Kirby in giving precedence to the name *hylas* of the Wiener Verzeichniss. Dr. Lang uses the name *hylas* of Esper (not the *hylas* of the Wiener Verzeichniss) for the species generally known as *dorylas*, Wiener Verzeichniss and Hübner.

Mant. Ins., vol. ii, p. 75, n. 696 (1787); *Hesperia hylus*, id., Ent. Syst., vol. iii, pt., 1, p. 300, n. 136 (1793); *Scolitantides hylus*, Butler, Cat. Fab. Lep. B. M., p, 167, n. 1 (1869); *Papilio baton*, Bergsträsser, Nomencl., vol. ii, p. 18; vol. iii, pl. lx, figs. 6—8 (1779); *Lycæna baton*, Elwes, Proc. Zool. Soc. Lond., 1881, p. 889; id., Lang, Butt. of Eur., p. 109, n. 14, pl. xxiv, figs. 2, *male* and *female* (1884); *Papilio hylactor*, Bergsträsser, l. c., vol. ii, pl. xlvii, figs. 7, 8 (1779); *Papilio amphion*, Esper, Schmett., vol. i, pt. 2, pl. liii, fig. 1 (1780); pl. lxxix, fig. 3 (1782); *Polyommatus vicrama*, Moore, Proc. Zool. Soc. Lond., 1865, p. 505, n. 105, pl. xxxi, fig. 6, *female*; *Scolitantides cashmirensis*, Moore, l. c., 1874, p. 272, n. 69; id., Butler, l. c., 1880, p. 408, n. 13.

HABITAT: Central and South-Eastern Europe, Western Asia (*Lang*); Askold, Vladivostock (*Elwes*); Afghanistan, Baltistan, Ladak, Kashmir, Lahoul, Kunawur.

EXPANSE: ♂, ·83 to 1·2; ♀, ·92 to 1·12 inches.

DESCRIPTION: "MALE. UPPERSIDE, *both wings* dull greyish-blue, exterior margins brown. *Cilia* broad, white, with brownish spots. UNDERSIDE, *both wings* greyish cream-colour, exterior margins defined by a black line. *Forewing* with a medial discoidal spot, another closing the cell; a series of spots recurving transversely from costa to posterior margin, and a submarginal row of spots black, each encircled with white. *Hindwing* with thirteen white-encircled black spots, and a marginal double row of red-interspaced black lunules. *Cilia* as above. FEMALE. UPPERSIDE, *both wings* bluish-purple brown, marked as in male." (*Moore*, l. c. of *Polyommatus vicrama*.)

"An uncommon species; to be seen flitting from flower to flower on moist meadow-land fed by streams from melting snow-beds. Chini in Middle Kunawur, and the Alps above the Chinese village of Shipkee in Thibet, are the localities; May, June, and July the season." (*Note by Colonel A. M. Lang, R.E.*)

As far as Indian specimens of *L. hylas* are concerned, I find that within rather narrow limits it is a variable species. The underside varies slightly from whitish to grey, and consequently the white rings round the black spots are more prominent in some specimens than in others; the spots also vary in number, in some specimens there are two spots close together in the middle of the cell, one below them in the submedian interspace, and the discal series of spots has an additional spot on the costa, in all three more spots than the normal complement; the spots of the discal series on the forewing are sometimes rounded, sometimes somewhat quadrate, and on the upperside the marginal palish lunules on the forewing and the dusky marginal spots on the hindwing are sometimes present, sometimes absent. All these differences are but slight, and on the whole I consider *L. hylas* to be a fairly constant species. Mr. Moore describes one form of the species under the name *L. cashmirensis* as below.* This description is not comparative either with his *L. vicrama* or the parent form *L. hylas*. Comparing the descriptions of *L. vicrama* and *L. cashmirensis* I find the following differences noted:—

	L. vicrama.	*L. cashmirensis.*
1.	Upperside, both wings, with no disco-cellular lunule.	Upperside, both wings, with a disco-cellular lunule.
2.	Upperside, forewing, with no marginal whitish lunules; hindwing with no marginal black spots.	Upperside, forewing, with marginal whitish lunules; hindwing with marginal black spots.
3.	Upperside, both wings, veins not blackish.	Upperside, both wings, veins blackish.
4.	Underside, both wings, black spots white-encircled.	Underside, both wings, black spots not white-encircled.
5.	Underside, both wings, ground-colour greyish-cream colour.	Underside, both wings, ground-colour pale cream colour.

* *Lycæna cashmirensis*, Moore. *Scolitantides cashmirensis*, Moore, Proc. Zool. Soc. Lond., 1874, p. 272,
n. 69; id., Butler, Proc. Zool. Soc. Lond., 1880, p. 408, n. 13. HABITAT: Sonamerg, N.-E. Kashmir;
Kandahar. EXPANSE: *Male*, 1·1; *female*, 1·12 inches. DESCRIPTION: "MALE. UPPERSIDE, *both wings* pale
greyisb-blue, slightly glossed with purple, veins blackish, a black disco-cellular lunule, and a blackish exterior
margin, the latter bordered inwardly by whitish lunules, which are most prominent on the margin of the *hind-*
wing, where they encircle a series of black spots. *Cilia* alternately white aud black. UNDERSIDE, *both wings*
pale cream-colour. *Forewing* with a pale black exterior marginal series of narrow spots, a decreasing submarginal
series of darker spots, an irregular discal series of quadrate black spots, a disco-cellular spot, two spots within
tbe cell and a small spot below it, disposed in a triangle. *Hindwing* with a marginal double row of black
spots, which are joined togetber by an intervening parallel series of bright orange spots, a curved discal series
of seven rounded black spots, three spots on anterior margin, a disco-cellular lunule, and two [or three] small
subbasal spots. FEMALE. UPPERSIDE, *both wings* dark fuliginous black, with a purplish gloss and blue scales
scattered from the base"

"Allied to *S.* [= *L.*] *hylas*, Wiener Verzeichniss, and to *S. vicrama*, Moore." (*Moore*, l. c.)

"Very common here [Kandahar] at the end of May and in June, but was rather local in Kashmir." (*Note by Major Howland Roberts*.)

After a careful examination of a very large series of specimens of *L. hylas* obtained in the Western Himalayas, I cannot find that the points of supposed difference between these two species holds good ; there are infinite slight gradations which link the two forms together, and these again to the European *L. hylas*.

L. hylas has a wide range in India, occurring to the eastward in Upper Kunawur, where Colonel Lang took it as high as 14,000 feet elevation above Shipkee. To the westward it is found as far as Kandahar. It does not appear to occur on the outer ranges of the Himalayas, though it is fairly common on the inner ranges in Kashmir, Baltistan, Ladak, &c., usually from 6,000 to 10,000 feet elevation, and always where a small-leaved prickly bush grows, on which its larva probably feeds. It differs a good deal in size. Colonel Lang's specimens from Upper Kunawur and Thibet, described as *P. vicrama* by Mr. Moore, and taken at a very great elevation, are very small, but I possess others taken much lower in Pangi and Ladak which are no larger. The markings of the underside are very prominent, and the spots vary in number but slightly. Mr. Moore, however, states that his *L. cashmirensis* has three spots near the base of the forewing on the underside disposed in a triangle. I have been able, out of the large series of this species before me, to discover only one pair, taken by myself in Ladak, which has these three spots ; in all the other specimens I possess from very widely-separated localities the upper of the two spots in the cell and the one beneath the cell is absent. This character is evidently a trivial one and may be disregarded.

The seventh and last group contains three Indian species which have quite a distinct *facies* from all the other Indian *Lycænæ*, being fuscous on the upperside in both sexes, irrorated with metallic greenish scales at the base, and with prominent markings. The Indian species are allied to *L. pyrenaica*, Boisduval, a Pyrenees species, and to *L. orbitulus*, De Prunner, which occurs on the Swiss Alps and in the Tyrol, also on the Pyrenees, and has many described local races or allied distinct species from Lapland, the high mountains of Northern and Central Asia ; and from Colorado, California, Washington Territory in America, and the Arctic region. As Mr. H. J. Elwes says :—" The distribution of the forms of this species [*L. orbitulus*] at many isolated points in the high alpine and arctic regions of the Palæarctic and Nearctic region is very curious, and worthy of a more detailed study.* Our first species, *L. jaloka*, Moore, occurs in Kashmir. The figure of it is so bad, and the description is insufficiently minute and precise, and is entirely non-comparative, so that I am doubtful even if it belongs to this group. I assume, however, that it does so, differing, as far as I can gather from the description, from the two other species on the underside of the hindwing in having no discal series of white spots, and from *L. leela*, de Nicéville, in having no spot in the middle of the cell on the underside of the forewing. The second species, *L. ellisi*, Marshall, occurs in Pangi and the adjoining Sanch Pass, and has the spots on the underside of the forewing entirely white. The third species, *L. leela*,† de Nicéville, occurs in Ladak, is larger than *L. ellisi*, has the spots on the underside of the forewing centred with black, and an additional spot in the discoidal cell.

669. Lycæna jaloka, Moore.

Polyommatus jaloka, Moore, Proc. Zool. Soc. Lond., 1874, p. 573, pl. lxvi, fig. 3, *male*.

HABITAT : Rajdiangan Pass, Sursungar and Stakpila Passes, and Baitul, Kashmir.

EXPANSE : ♂, ♀, 1·0 inch.

DESCRIPTION : " MALE. UPPERSIDE, *both wings* shining greenish-blue basally, outer margins bluish-purple, with a distinct black pale-bordered disco-cellular spot and a transverse discal row of pale bluish-white spots. UNDERSIDE, *forewing* pale grey, with indistinct pale-bordered disco-cellular spot, and a transverse discal row of blackish spots. *Hindwing* white, the base powdered with metallic blue ; a broad irregular discal pale brown band enclosing a disco-cellular and two upper white patches. FEMALE. UPPERSIDE, *both wings* dark purplish-brown, glossed with greenish-blue ; disco-cellular spot larger than in the male and

* Trans. Ent. Soc. Lond., 1887, p. 393.

† Leela is a Hindu god ; in Hindustani it also means blue.

very prominent, discal spots whiter than in the male. UNDERSIDE, *forewing* pale fawn-colour, spots prominent, a blackish streak outside the discal spots. *Hindwing* with the irregular discal band tinged with yellow. *Cilia* white, with inner black line on the forewing and black dentate spots on the hindwing." (*Moore*, l. c.)

Mr. Moore in the above description gives no indication to what species his *L. jaloka* is allied, but from the description it appears to be of the *orbitulus* group. The figure of *L. jaloka* shows a very curiously-shaped insect, the wings very long and narrow, the inner margin of the forewing very long, the outer margin very straight, giving the forewing a truncated appearance.

670. **Lycæna ellisi,** Marshall.

Polyommatus ellisi, Marshall, Journ. A. S. B., vol. li, pt. 2, p. 41, n. 6, pl. iv, fig. 4, *male* (1882).

HABITAT : Pangi, 12,000 feet, June ; Sanch Pass, Pangi, 14,000 feet, August.

EXPANSE : ♂, ♀, ·9 to 1·05 inches.

DESCRIPTION : "MALE. UPPERSIDE, *both wings* dark greyish-black, the basal portions powdered with metallic greenish-golden scales, the outer halves with a bronzed sheen. *Forewing* with a dark-centred white spot at the end of the cell, and a discal series of four prominent white spots sometimes dark-centred. *Hindwing* also with a white spot at the end of the cell, and a small white one above it near the costa ; a discal series of four white spots, corresponding with those on the forewing. UNDERSIDE, *both wings* creamy-white. *Forewing* brownish on the disc, with the outer margin broadly paler, the spots of the upperside large, indistinct, and paler still. *Hindwing* with the base metallic greenish-golden, deepening into brown up to the discal row of spots, the outer margin creamy-white, the spots of the upperside large, indistinct, white. FEMALE. UPPERSIDE, *both wings* differ from the male in lacking the brilliant metallic scales."

"The type specimen (which has been presented to the Indian Museum, Calcutta) was taken on the Sanch Pass in Pangi, North-West Himalayas, at an elevation of 14,000 feet above the sea in August, by Mr. Robert Ellis, after whom I have named it. Several other specimens were taken at the same time all corresponding with the type specimen. Others were taken in Pangi in June at an elevation of 12,000 feet, which have less of the metallic sheen, and have the white spots on the upperside considerably smaller ; these latter evidently belong to the same species, but whether they are seasonal or geographical varieties is uncertain." (*Marshall*, l. c.)

671. **Lycæna leela,** de N.

L. ? *leela*, de Nicéville, Journ. A. S. B., vol. lii, pt. 2, p. 66, n. 2, pl. i, figs. 3, *male* ; 3*a*, *female* (1883).

HABITAT : Ladak.

EXPANSE : ♂, ♀, 1·1 to 1·2 inches.

DESCRIPTION : "MALE. UPPERSIDE, *both wings* blackish, powdered up to the discal rows of spots with metallic pale green scales. *Forewing* with a prominent black white-encircled spot at the end of the cell, and a discal curved series of five (in one specimen) or six (in two specimens) whitish spots, with indistinct dark centres. *Hindwing* with a spot closing the cell, less prominently black than in the forewing, a white spot placed outwardly above it, and four spots on the disc, whitish. UNDERSIDE, *both wings* greyish-white, pale brown on the disc, and the base pale greenish. *Forewing* with a spot in the middle of the cell, a large one closing it, a discal series of six or seven spots, of which the two lower ones are smaller than the rest, and (when both are present) geminate, all black with prominent white margins ; the outer margin almost pure white with an indistinct series of spots. *Hindwing* with a spot below the costa near the base, a very large spot at the end of the cell, a very irregular discal series of seven spots, and a marginal double series of coalescing lunules, white. *Cilia* very long and white. FEMALE. UPPERSIDE, *both wings* deeper coloured, with a few scattered pale greenish metallic scales at the base only. *Forewing* with the discal series of spots prominently centred with black, and variable in number from four to six. *Hindwing* with the spots smaller and less prominent than

in the male. UNDERSIDE, *both wings* variable in tone of colour, being much darker in some specimens (including the type specimen figured) than in others, the discal markings sometimes blurred and running into the pale margin beyond, otherwise much as in the male."

"Closely allied to *Polyommatus ellisi*, Marshall, but the male differing from the type specimen of that species in having the apex and the outer margin of the forewing more rounded; in *P. ellisi* the apex is acute, and the outer margin straight; the upperside of both wings paler in colour and more broadly irrorated with greenish scales, the discal spots more numerous; the markings on the underside throughout more prominent, and with an additional spot in the cell of the forewing. The colouring of the figure of *P. ellisi* is much too vivid, the metallic colouring of the base of the wings and the body is a very pale green."

"*Lycæna wosnesenskii*, Ménétriés (Cat. Mus. Petr., Lep., vol. i, pp. 58, 95, n. 964, pl. iv, fig. 6, 1855), is also a closely allied species, the upperside being figured with the apex of the forewing very acute, the figure of the underside shewing it quite rounded. It is recorded from Kamtchatka."

"This species (*L. leela*) was found by me only on passes; the female figured was taken near the top of the Zoji-la on the Ladak side at about 11,000 feet elevation on June 27th, 1879; on July 2nd seven specimens of both sexes on the Mamyika Pass, Ladak, 13,000 feet; and, lastly, on July 3rd, seven more specimens on the Fotu-la, Ladak, at about the same elevation." (*de Nicéville*, l. c.)

The three preceding species are decidedly very closely allied, and are perhaps at best geographical varieties or local races only; hereafter, if larger series be collected from Ladak, Kashmir, Chumba, and intermediate tracts, it may be found that these forms are completely connected by intermediate gradations, and thus compose but one rather variable species. In the meantime they are recorded as distinct species—*L. jaloka* from Kashmir, *L. ellisi* from Pangi, and *L. leela* from Ladak.

Genus 109.—CHILADES, Moore. (PLATE XXVI).

Chilades, Moore, Lep. Cey., vol. i, p. 76 (1881).

"FOREWING, elongated, triangular in the female; *costal nervure* extending to nearly half length of the margin; *first subcostal nervule* free from costal nervure but running along its end, emitted beyond one-half before the end of the cell, *second* subcostal at one-third, *third* subcostal at one-sixth, *fourth* subcostal at one-half from third, and terminating before the apex; *fifth* subcostal [upper discoidal] from the end of the cell; *disco-cellular* nervules slightly oblique, nearly straight; *radial* [lower discoidal] nervule from their middle; *discoidal cell* long, extending to more than half the wing; *second median nervule* emitted at one-sixth before the end of the cell; *first* median beyond one-half before the end; *submedian nervure* straight. HINDWING, oval; *exterior margin* very convex; no tail; *costal nervure* arched at base, extending to apex; *first subcostal nervule* emitted at one-third before the end of the cell; *upper disco-cellular* nervule oblique, *lower* disco-cellular erect; *radial* nervule from their middle; *discoidal cell* short, broad; *third* and *second median nervules* emitted from the end of the cell, *first* median at one-half before the end; *submedian* and *internal nervures* straight. BODY small, short; *palpi* slender, porrect, second joint long, projecting two-thirds beyond the head, attenuated at its tip, clothed with long adpressed scales, third joint very long, naked; *legs* slender; *antennæ* with a stout grooved club. Type, *C. laius*, Cramer." (*Moore*, l. c.)

The neuration of the forewing I should describe as follows: Costal nervure terminating just before the apex of the discoidal cell, slightly bent downwards or bowed just before its termination; first subcostal nervure bent upwards to meet that portion of the costal nervure which is bent downwards; second subcostal with its base a little nearer to the base of the first subcostal than to the base of the upper discoidal; third subcostal emitted from the subcostal nervure nearer the apex of the cell than of the wing; upper disco-cellular nervule wanting; middle disco-cellular emitted from the upper discoidal some little distance beyond its base. In the hindwing the second median nervule is emitted just before the lower end of the cell. The

genus is a very poor one, and can only be maintained for convenience, as, as far as I can discover, it does not differ structurally in the slightest degree from the genus *Lycæna*, Fabricius.

As far as I know, two species only have been placed in this genus. One, *C. laius*, Cramer, occurs almost throughout India and Ceylon, but not in the Malay Peninsula, and is found again in Formosa and China. In this species seasonal dimorphism of a very marked character obtains, the specimens flying in the winter having a prominent fuscous nebulous patch on the underside of the hindwing, which is entirely absent from the specimens that fly in the rains. The rains form of *C. laius* is a very ordinary looking "blue," though the winter form of it is so peculiar from the presence of the patch mentioned above. The other species, *C. trochilus*, Freyer, has a wide range, occurring in South Africa, North and South Tropical Africa, Extra-Tropical North Africa, South-East Europe, Asia Minor, Persia, Aden, almost throughout India and Ceylon, but not in the Malay Peninsula, as far as is known, reappearing however in Java, Sumba, Sambawa, and Australia. *C. trochilus* in both sexes is glossy fuscous above, in the hindwing with a marginal row of round black spots, the anal ones of which are sometimes crowned with orange, and all on the underside very prominently black with greenish silvery metallic scales, and often crowned with orange. It is a very small butterfly, perhaps the smallest but one occurring in India.

I have been so fortunate as to discover the transformations of both the species of *Chilades*, a description of them will be found under the description of the species. The larvæ and pupæ of both species are of the usual Lycænid shape, and the former are attended by ants.

Key to the species of Chilades.

A. Male and female more or less blue on the upperside, the marginal spots on the underside of the hindwing never crowned with orange or ochreous, or sprinkled with metallic-greenish scales.

672. C. LAIUS, India, Ceylon, Burma, China.

B. Male and female entirely dull black on the upperside without any blue coloration, the marginal spots on the underside of the hindwing crowned with orange or ochreous, and sprinkled with metallic-greenish scales.

673. C. TROCHILUS, Europe, Africa, Asia Minor, Arabia, Persia, throughout India, Ceylon, Burma, Java, Sumba, Sambawa, Australia.

672. **Chilades laius**, Cramer. (PLATE XXVI, FIGS. 168, ♂ WET-SEASON FORM; 169, ♂ DRY-SEASON FORM).

Papilio lajus, Cramer, Pap. Ex., vol. iv, p. 62, pl. cccxix, figs. D, E, *female* (1780); *Polyommatus laius*, Horsfield and Moore, Cat. Lep. Mus. E. I. C., p. 21, n. 7, pl. xii, figs. 1, *larva*; 1a, *pupa* (1857); id., Moore, Proc. Zool. Soc. Lond., 1878, p. 702; *Lycæna laius*, Butler, Cat. Fab. Lep. B. M., p. 171, n. 19 (1869); *Chilades laius*, Swinhoe, Proc. Zool. Soc. Lond., 1885, p. 133, n. 62; idem, id., l. c., 1886, p. 427, n. 52; id., Doherty, Journ. A. S. B., vol. lv, pt. 2, p. 133, n. 166 (1886); *Hesperia cajus*, Fabricius, Ent. Syst., vol. iii, pt. 1, p. 296, n. 126 (1793); *Polyommatus cajus*, Godart, Enc. Méth., vol. ix, p. 701, n. 242 (1823); *P. varunana*, Moore, Proc. Zool. Soc. Lond., 1865, p. 772, pl. xli, fig. 6; idem, id., Proc. Zool. Soc. Lond., 1878, p. 702; *Chilades varunana*, id., Lep. Cey., vol. 1, p. 77, pl. xxxv, fig. 3, *male* (1881); idem, id., Proc. Zool. Soc. Lond., 1882, p. 245; id., Swinhoe, l. c., 1885, p. 133, n. 63; idem, id., l. c., 1886, p. 427, n. 51; id., Wood-Mason and de Nicéville, Journ. A. S. B., vol. lv, pt. 2, p. 365, n. 111 (1886); *Polyommatus kandura*, Moore, Proc. Zool. Soc. Lond., 1865, p. 772, pl. xli, fig. 7, *female*; *Zizera kandura*, Swinhoe, Trans. Ent. Soc. Lond., 1885, p. 341, n. 24; *Lycæna brahmina*, Felder, Reise Novara, Lep., vol. ii, p. 279, n. 350, pl. xxxv, figs. 15, 16, *female* (1865).

HABITAT: Coromandel Coast (*Cramer*); Hong-Kong, Formosa, China (*Butler*); N.-W. Himalayas; Bengal; Ceylon; Hainan (*Moore*); Quetta; Poona; Mhow (*Swinhoe*); Cachar (*Wood-Mason* and *de Nicéville*); Calcutta (*de Nicéville*); Bengal (*Felder*).

EXPANSE: ♂, ·90 to 1·20; ♀, 1·00 to 1·25 inches.*

Wet-season form.

DESCRIPTION: "MALE. UPPERSIDE, *both wings* dull purple-blue, exterior margins with a slight pale brown border. *Hindwing* with two or three ill-defined blackish pale-bordered

* Mr. Moore gives the expanse of his *P. kandura* as 1·5 inches; this must be a mistake, the specimen figured measuring 1·05 only.

marginal spots from anal angle. UNDERSIDE, *both wings* grey. *Forewing* with a brown white-bordered spot closing the cell, a transverse row of blackish white-bordered discal spots, and a double row of marginal white-bordered lunules. *Hindwing* with three [four] transverse subbasal jet-black white-bordered round spots, and a fourth [fifth spot] on the middle of the costa; a pale brown streak closing the cell, a discal series of dark brown spots, a submarginal row of brown lunules, and a marginal series of blackish triangular spots, all bordered with white. *Palpi* and *legs* above black, beneath white. FEMALE. UPPERSIDE, *both wings* brown. *Forewing* with a lower basal blue patch, and a narrow black spot closing the cell. *Hindwing* with the black white-bordered marginal spots more defined," a basal blue patch, UNDERSIDE, *both wings* as in the male. (*C. varunana*, Moore, l. c. in Proc. Zool. Soc. Lond., 1865).

Dry-season form.

DESCRIPTION: MALE. UPPERSIDE, *both wings* as in the male of the wet-season form. UNDERSIDE, *both wings* as in the wet-season form, but the *hindwing* with the anal third bearing a blackish nebulous patch. FEMALE. "UPPERSIDE, *both wings* bright purple-olive. *Forewing* pale brown on apical and exterior margins. [*Hindwing* with] a row of small rounded darker brown marginal spots. UNDERSIDE, *both wings* white, at the base greyish-white. *Forewing* with a dark brown white-bordered spot closing the cell, and a transverse discal series beyond, two marginal rows of dusky lunules. *Hindwing* with a large dark brown patch on the lower exterior quarter of the wing, a marginal and an irregular discal series of dark brown white-bordered spots, those crossing the brown patch bordered with darker brown, a double row of marginal dusky lunules." (*C. kandura*, Moore, l. c. in Proc. Zool. Soc. Lond., 1865).

LARVA pale green at all stages, of the shade of the young leaves of the lime and pomolo bushes on which it feeds. When full-grown it is about 7/16 of an inch in length, onisciform as usual, the head black, smooth, and shining, with a somewhat dark green dorsal line down the body, the whole surface but very slightly shagreened, and covered with extremely fine and short downy hairs. The constrictions between the segments slight. There are traces of two pale subdorsal lines, and there is a pale lateral line below the spiracles. The usual extensile organs on the twelfth segment short. This larva has no distinctive markings by which it can be easily recognised; it is altogether a very plainly-coloured and marked insect. I have found it commonly in Calcutta during the rains, the ant which attends it betraying its presence. The latter has been identified by Dr. A Forel as "*Camponotus rubripes*, Drury (*sylvaticus*, Fabricius), subspecies *compressus*, Fabricius." PUPA green, of the usual Lycænid shape, with a dorsal and lateral series of somewhat obscure conjoined brownish spots on the upperside. Attached to the underside of the leaves of its food-plant in the usual manner. Mr. Moore has figured an entirly different larva, as the larva of this species.

No author except Mr. W. Doherty has placed the two very distinct forms which occur in the rains and dry-season respectively under one specific name. Should it be desired to separate them, *laius* (*lajus*), Cramer, *cajus*, Fabricius and Godart, *kandura*, Moore, and *brahmina*, Felder, represent the dry-season form, with the large black patch on the underside of the hindwing in both sexes; while *varunana*, Moore, represents the rainy-season form which lacks the black patch. Though these extremes are well-marked, I find that every gradation exists between them in the long series of specimens now before me. In every way the species is very variable; not only is the black patch both present and absent, but the other markings are sometimes very prominent, at others very obscure. The female on the upperside is sometimes almost entirely fuscous, just sprinkled with blue scales at the base of the wings, sometimes with almost as much blue as in the male, but of a more metallic sheen.

Colonel Swinhoe records this species from Quetta. I have seen the specimen, which, though very worn, is unquestionably *C. laius*. Quetta is, I think, a rather doubtful locality for it. It occurs, however, in the North-West Provinces and eastwards through Bengal to Upper Assam and Burma; it is found throughout continental and peninsular India and Ceylon; it has not been recorded hitherto from the Andaman and Nicobar Isles, or the Malay Penin-

sula and Archipelago, but it reappears again in Southern China. In India it may be confidently looked for wherever any trees allied to the orange grow.

Figure 168 shows the upper and undersides of a male wet-season form; Fig. 169 shows both sides of a male dry-season form, both from Bholahât, Malda, in my collection.

673. **Chilades trochilus**, Freyer.

Lycæna trochilus, Freyer, Neuere Beiträge Schmett., vol. v, p. 98, pl. ccccxl, fig. 1 (1844); id., Herrich-Schäffer, Schmett. Eur., vol. i, p. 128, pl. xlviii, figs. 224, 225, *male*; pl. xlix, fig. 226, *female* (1844); id., Wallengren, Kongliga Svenska vet.-akad. Handl., Lep. Rhop. Caffr., second series, vol. ii, p. 41, n. 14 (1857); id., Trimen, Rhop. Afr. Aust., vol. ii, p. 256, n. 157 (1866); id., Lang, Butt. of Eur., p. 103, n. 6, pl. xxii, fig. 7 (1884); id., Trimen, South-Afr. Butt., vol. ii, p. 52, n. 144 (1887); *Polyommatus trochilus*, Kirby, Eur. Butt., p. 99 (1862); *Plebeius trochilus*, Butler, Proc. Zool. Soc. Lond., 1886, p. 368, n. 50; *Zizera trochilus*, Butler, Proc. Zool. Soc. Lond., 1884, p. 484, n. 14; id., Swinhoe, Trans. Ent. Soc. Lond., 1885, p. 341, n. 25; idem, id., Journ. Bomb. N. H. Soc., vol. ii, p. 273, n. 26 (1887); *Lycæna putli*, Kollar, Hügel's Kaschmir, vol. iv, pt. 2, p. 422, n. 8 (1848); id., Semper, Journ. des Mus. Godef., vol. xiv, p. 160, n. 72 (1879); *Chilades putli*, Moore, Lep. Cey., vol. i, p. 77, pl. xxxv, figs. 4, 4*a* (1881); idem, id., Proc. Zool. Soc. Lond., 1882, p. 245; id., Swinhoe, Proc. Zool. Soc. Lond., 1884, p. 507, n. 27; idem, id., l. c, 1886, p. 427, n. 50; *Plebeius putli*, Butler, Proc. Zool. Soc. Lond., 1886, p. 368, n. 51; idem, id., Ann. and Mag. of Nat. Hist., fifth series, vol. xviii, p. 187, n. 30 (1886); *Everes putli*, Doherty, Journ. A. S. B., vol. lviii, pt. 2, p. , n. (1889); *Lycæna isophthalma*, Herrich-Schäffer, Stett. Ent. Zeit., vol. xxx, p. 73, n. 29 (1869); *Lycæna parva*, Murray, Trans. Ent. Soc. Lond., 1874, p. 526, pl. x, fig. 1; *L. gnoma*, Snellen, Tijd. voor Ent., vol. xix, p. 159, n. 48, pl. vii, fig. 1 (1876).

HABITAT: South-Eastern Europe; many parts of Africa; Asia Minor; Syria; Persia; Aden; almost throughout India; Ceylon; Java; Sumba; Sambawa; Australia.

EXPANSE: ♂, ♀, ·6 to 1·0 inch.

DESCRIPTION: "MALE. UPPERSIDE, *both wings* violet-brown. *Hindwing* with indistinct marginal pale-bordered black spots [these spots are sometimes large and prominent, and more or less crowned inwardly with orange, occasionally the black spots are slightly defined inwardly as well as outwardly by a narrow white line, and with a discal series of fine white lunules.] *Cilia* cinereous-white. UNDERSIDE, *both wings* cinereous-brown. *Forewing* with a white-bordered brown disco-cellular spot, a transverse discal and a submarginal row of similar spots. *Hindwing* with a white-bordered black costal spot, four transverse subbasal spots, and one near the base of the abdominal margin; a white-bordered brown disco-cellular spot, and a transverse discal row of similar spots, a marginal row of [three, four, five, or] six prominent black conical spots speckled with metallic-green, the outer one at each end less distinct, each bordered by ochreous-yellow and above by a double white lunular line. FEMALE. UPPERSIDE, *both wings* similar. *Hindwing* with the marginal spots slightly [often prominently] bordered with ochreous [or orange]. UNDERSIDE, *both wings* with the markings more distinct than in the male." (*Moore*, l. c, in Lep. Cey.)

LARVA when full-grown a little over a quarter of an inch in length, onisciform as usual; the head very small, black and shining, entirely hidden when at rest, being covered by the second segment; the colour of the body grass-green, with a dark green dorsal line from the third to the twelfth segment; two subdorsal series of short parallel streaks, each pair being divided from the next by the segmental constriction, these streaks paler than the ground-colour; an almost pure white lateral line below the spiracles, which is the most conspicuous of all the markings; the segmental constrictions rather deep; the whole surface of the body shagreened, being covered with very small whitish tubercles from which spring very fine short colourless hairs. The usual extensile organs on the twelfth segment. Dr. George King, Superintendent of the Royal Botanical Gardens, Sibpur, near Calcutta, has identified its food-plant as *Heliotropium strigosum*, Willd. Professor A. Forel identifies the ant which attends it as *Pheidole quadrispinosa*, Jerdon. PUPA about $\frac{3}{16}$ of an inch in length, pale green, of the usual Lycænid shape, densely covered everywhere except on the wing-cases with somewhat long white hairs. The transformations of this species are here described for the first time.

Semper has done much in clearing up the synonymy of this species by adding to it the *L. gnoma* of Snellen, Trimen has added the *L. parva* of Murray, and I join to it for the first time the *L. putli* of Kollar. Butler and Swinhoe record the true *C. trochilus* from India, the

former from near Attock on the Khairabad side, taken by Major J. W. Yerbury in November, and the latter from Karachi in June, and the Hubb River, Biluchistan, in September, also from Quetta. The only difference between typical *C. trochilus* and *C. putli* is that the former has the orange markings above the marginal black spots on the upperside of the hindwing very prominent ; while in the latter this colour is absent altogether or replaced by ochreous. The most typical specimens of true *C. trochilus* which I possess are from Aden, but I have a very fine series of the species taken by Mr. W. H. Irvine at Bholahât, Malda, some of which have almost as much orange as the Aden specimens, while others almost entirely lack that coloration, and all intergrade specimens exist. In India *C. trochilus* occurs practically almost everywhere, from Karachi in the west, all along the outer Himalayas to Upper Burma in the east, and throughout continental and peninsular India and Ceylon. It has not as yet been recorded from the Andaman or Nicobar Isles, or from the Malay Peninsula, but it is almost sure to be found in the latter region hereafter, as it occurs in Java, Sumba, and Sambawa. In Ceylon Wade records it from "Kandy and Trincomalee, found in grass. Rare." The jewelled spots of the hindwing on the underside are quite *sui generis*, and make this species one of the most easily identifiable of the "Blues."

Genus 110.—CYANIRIS, Dalman. (FRONTISPIECE and PLATE XXVI).

Cyaniris, Dalman, Kongl. Vetensk. Acad. Handl., vol. xxxvii, pp. 63, 94 (1816) ; id., Billberg, Enum. Ins., p. 80 (1820) ; id., de Villiers and Guénée, Lép. d'Eur., p. 19 (1835) ; id., Moore, Lep. Cey., vol. i, p. 74 (1881) ; id., de Nicéville, Journ. A. S. B., vol. lii, pt. 2, p. 67 (1883) ; id., Distant, Rhop. Malay., p. 210 (1884) ; *Lycænopsis*, Felder, Reise Novara, Lep., vol. ii, p. 257 (1865).

"FOREWING, elongated, triangular ; *exterior margin* slightly oblique and convex, *posterior* margin long ; *costal nervure* extending to half length of the margin ; *first subcostal nervule* emitted at nearly one-half before the end of the cell, free from the costal nervure ; *second* subcostal at one-third, *third* subcostal at about one-eighth before the end of the cell, *fourth* at one-half from the third and terminating at the apex ; *fifth* [upper discoidal] from the end of the cell ; *disco-cellular nervules* slightly concave ; *lower discoidal* nervule from their middle; *discoidal cell* long, somewhat narrow, extending to more than half the wing ; *second median nervule* emitted about one-seventh before the end of the cell, *first* median at nearly one-half before the end ; *submedian nervure* slightly recurved. HINDWING, oval ; *apex* very acute ; *costal nervure* curved at the base, extending to the apex ; *first subcostal nervule* emitted at one-fourth before the end of the cell ; *upper disco-cellular* nervule the shorter, outwardly oblique, *lower* disco-cellular straight, erect, *discoidal* nervule from their middle ; *discoidal cell* rather short ; *second median nervule* emitted from immediately before the end of the cell ; *first* median at one-third before the end ; *submedian* and *internal nervures* straight. BODY slender, short ; *palpi* porrect, second joint pilose beneath, projecting half beyond the head ; third joint slender and about half its length, naked ; *legs* slender, femora slightly pilose beneath ; *antennæ* with a lengthened spatular club. Type, *C. argiolus*," Linnæus, the "Holly-Blue" of England. (*Moore*, l. c.)

In the forewing the costal nervure ends exactly opposite the apex of the discoidal cell ; the first subcostal nervule in the type species is free from the costal nervure, in a male of *C. transpectus*, Moore, it lies along and touches the costal nervure for some little distance, while in a female of the same species it lies close to but is free from that nervure ; second subcostal with its base half as far from the base of the first subcostal as from the base of the upper discoidal ; third subcostal rather short, emitted from the subcostal nervure about midway between the apex of the wing and the base of the upper discoidal. The eyes are hairy.

The genus *Cyaniris* is very near to *Lycæna*, Fabricius ; as far as neuration goes, it is probable that, if all the species of both genera were examined, no constant character between them would be found. In the specimens of each that I have examined I find that the first subcostal nervule of the forewing is quite free in *Lycæna*, in *Cyaniris* it either touches the costal nervure for a short distance or approaches it very closely ; in *Cyaniris* the base of the second subcostal nervule is nearer to the base of the first than it is to the base of the upper discoidal nervule, in *Lycæna* it is just equi-distant between them ; lastly, in *Cyaniris* the third subcostal

nervule arises much nearer to the apex of the wing than in *Lycæna*. Although the structural characters of the two genera differ so slightly, there is considerable difference in the *facies*, and also I think in habits, and something in distribution :—in *Lycæna* the spots of the underside usually assume the form of blind ocelli, *i.e.*, are composed of a dark centre and outer pale portion ; they are mostly low-flying grass-loving butterflies ; and the genus is almost purely a Palæarctic one : while in *Cyaniris* the markings are hardly ever ocellular ; the butterflies chiefly affect trees and bushes, though the males may often be found in immense quantities sucking up the moisture on damp spots ; and the genus is both Palæarctic and Tropical.

Most writers use the name *Lycæna* for all the butterflies which belong to this genus, so I am quite unable to give either its distribution (though it certainly occurs throughout the Nearctic, Palæarctic and Oriental regions), nor the number of species it contains, but they are certainly very numerous. In India it is found almost everywhere except in the desert regions of Sind, and occurs at considerable elevations in the Himalayas ; Mr. W. Doherty records *C. huegelii*, Moore, in Kumaon from 3,500 to 12,000 feet ; and I have met with some species even at a greater elevation. In the outer Himalayas one species or another is more plentiful in individuals than any other of the *Lycænidæ*. In Sikkim not only do many species actually swarm, but the number of distinct species occurring there is very great. In the plains of India proper *C. puspa* is the only species commonly met with, but wherever hills occur there will several species be found. The males of most of the different species can with a little study be made out satisfactorily, but in the case of three common species occurring in Sikkim, *C. marginata*, de Nicéville, *C. placida*, de Nicéville, and *C. dilectus*, Moore, though literally hundreds of females have passed through my hands, I have quite failed to pair them with their respective males. Messrs. Moore and Doherty have described the female of *C. marginata*, but from these descriptions I am unable to distinguish that sex from the female of *C. puspa*, Horsfield.

In North America Mr. W. H. Edwards has proved by careful breeding that one species, *Lycæna* (= *Cyaniris*) *pseudargiolus*, Boisduval and Leconte, exhibits seasonal dimorphism to a wonderful extent, and in his "Butterflies of North America" has devoted several plates to these different forms and to the transformations of the species. It was in the larva of this species that he first noticed the peculiar organs affected by ants, and he has given very beautiful drawings of their various parts. In India, although it has not been proved by breeding as it has been in North America, seasonal dimorphism almost certainly occurs to a considerable extent. This is especially marked in *C. marginata* and *C. transpectus*, less so in *C. puspa*, *C. jynteana*, *C. placida* and *C. dilectus*. The dimorphism takes the usual form of darkening the coloration and markings in the rains, lightening the coloration and reducing the size and distinctness of the markings in the dry-season. All these species occur in the Eastern Himalayas. Whether or not this dimorphism occurs in the species of the Western Himalayas I cannot say, but it certainly would not be of so marked a nature, as the rainy season is shorter and not so severe there as it is to the eastward.

The transformations of only one Indian species are known. Dr. Lang in his "Butterflies of Europe," p. 128, describes the larva of the type species of the genus (*C. argiolus*, Linnæus) as "dark greenish-grey, with a dark green dorsal line. Feeds on the flowers of *Ilex*, *Hedera* and *Rhamnus* in June, and again in the autumn." I should expect to find the larvæ of *C. huegelii* and *C. cœlestina* feeding on the Barberry in the Western Himalayas, as the imagines seem always to affect those bushes.

Key to the Indian species of Cyaniris.

A. Male, upperside, both wings white, with base black, irrorated with metallic blue ; female with no blue on upperside whatever.

674. C. AKASA, South India, Ceylon, Java, Sambawa.

B. Male upperside, both wings blue, sometimes with white patches ; female (except *C. transpectus*) with more or less iridescent blue on the disc and base.

a. Of large size ; both sexes with outer third of forewing on upperside black, a prominent disco-cellular spot ; underside with markings few in number, extremely prominent on forewing.

675. C. VARDHANA, Western Himalayas.

b. Of smaller size (except *C. huegelii*); male with costal margin of forewing broadly black, occupying half of discoidal cell on upperside.
*a*¹. Male, upperside, both wings with a discal white patch.
676. C. MARGINATA, Kumaon, Nepal, Sikkim, Burma.
*b*¹. Male, upperside, both wings with no discal white patch.
677. C. MELÆNA, Burma.
c. Males with costal area of forewing, except at apex, blue on upperside.
*a*¹. Males with black area on upperside of forewing at apex, occupying outer one-fourth.
*a*². Male with outer black border to forewing on upperside reduced to a fine line at anal angle; markings on underside small, but all equally prominent.
678. C. ALBOCÆRULEUS, Himalayas.
*b*². Male with outer black border to forewing on upperside broad at anal angle.
*a*³. Underside with markings large and placed irregularly.
*a*⁴. Male, upperside dull blue, with hardly any iridescent gloss; female with no blue on upperside.
679. C. TRANSPECTUS, Sikkim, Assam, Burma.
680. C. LATIMARGO, N.-E. Bengal, Sikkim.
*b*⁴. Male, upperside rich bright iridescent purplish-blue.
681. C. PUSPA, India, Ceylon, Andamans, Burma, Java.
*b*³. Underside with markings small and placed regularly.
682. C. CHENNELLII, Shillong.
*b*¹. Males with black area at apex of forewing on upperside occupying less than outer one-fourth, widest at the apex.
*a*². Male with prominent white well-defined patches on upperside.
683. C. ALBIDISCA, Nilgiri, Annamalai, and Pulni Hills.
*b*². Male never with prominent white well-defined patches on upperside (in dry-season form of *C. jynteana* there are irrorated whitish patches).
*a*³. Markings on underside large and irregularly placed.
*a*⁴. Male, upperside brilliant iridescent blue.
684. C. CYANESCENS, Nicobars.
*b*⁴. Male, upperside dull non-iridescent purplish-blue.
685. C. PLACIDA, Sikkim, Assam, Burma, Penang.
*b*³. Markings on underside small and evenly placed.
*a*⁴. Male, upperside, hindwing with marginal series of black spots.
686. C. JYNTEANA, Sikkim, Assam, ? Malacca.
687. C. SIKKIMA, Sikkim.
*b*⁴. Male, upperside, hindwing with no marginal series of black spots.
688. C. CŒLESTINA, Western Himalayas.
*c*¹. Male with black area of forewing on upperside reduced to a fine marginal line of equal width throughout.
*a*². Males pale blue on upperside.
*a*³. Of small size; male usually with white irrorated patches on upperside of both wings.
689. C. DILECTUS, Himalayas, Assam, Upper Burma.
*b*³. Of larger size; male never with white irrorated patches on upperside of both wings.
*a*⁴. Both sexes, underside, forewing with submarginal lunulated band usually widened out posteriorly into prominent quadrate spots, these spots further from the margin than in the next species.
690. C. HUEGELII, Western Himalayas.
*b*⁴. Both sexes, underside, forewing with submarginal lunulated band of equal width throughout, these spots nearer the margin than in *C. huegelii*.
691. C. SINGALENSIS, Nilgiris, Ceylon.
*b*². Males dark blue on upperside.
*a*³. Discal series of spots on underside of forewing arranged regularly, forming almost a straight line.
692. C. LANKA, Ceylon.
*b*³. Discal series of spots on underside of forewing arranged irregularly, not almost forming a straight line.
693. C. LIMBATUS, Assam, Parisnath, Nilgiris, Travancore, Ceylon.

674. Cyaniris akasa, Horsfield.

Polyommatus akasa, Horsfield, Cat. Lep. Mus. E. I. Co., p. 67, n. 2, pl. i, figs. 1, 1*a*, *male* (1828); *Cyaniris akasa*, Moore, Lep. Cey., vol. i, p. 75, pl. xxxiv, fig. 5, *male* (1881).

HABITAT: Shevaroy, Nilgiri, Annamalai and Pulni Hills; Ceylon; Java; Sambawa.

EXPANSE: ♂, 1·0 to 1·1; ♀, 1·25 inches.

DESCRIPTION: MALE "UPPERSIDE, *both wings* with the base blackish-brown, covered from the base to the disc with an azure irroration; (and in one of our specimens the disc is marked with an obscure curved fascia of brown). *Forewing* with the disc white, a broad belt along the anterior and posterior margins blackish-brown. *Hindwing* with almost the whole surface white, marked with a few scattered dots of blackish-brown and surrounded by a streak of the some colour, interior to which is an interrupted series of delicate brown lines. UNDERSIDE, *both wings* milky white. *Forewing* with a series of five short brown lines disposed in an interrupted curve towards the posterior margin, exterior to which are a few faint marginal dots, and a short transverse streak arises near the costa and extends to the middle of the disc. *Hindwing* has the marginal dots of a more intense tint and continued in a regular series along the posterior margin; the disc is pervaded by a very irregularly-curved series of about seven dots, commencing near the anterior margin, the first being disposed in pairs; three solitary distant dots are placed in the order of a transverse line towards the base. About eighteen dots, in all, may be counted on the underside of the hindwing. *Antennæ* banded with white; they depart in a small degree from the regular type, and give the butterfly a peculiar aspect; the club is strongly compressed and semi-contorted at its base, in consequence of which a swelling appears at the point of union with the filiform portion, which is not usual in this genus. *Thorax* and *abdomen* agreeing with the adjoining tint of the wings on both surfaces."

"In its physiognomy and in the distribution of the markings of the lower surface, it resembles the *P.* [= *C.*] *argiolus*, Linnæus, of the British Fauna." (*Horsfield*, l. c.)

Dr. Horsfield does not give the sex of the two specimens he described; they appear to have been males, however, as he mentions the blue gloss on the upperside. Mr. Moore seems to take the opposite view, as in his "Lepidoptera of Ceylon" he describes the female as blue-glossed, but says nothing about that colour in the male. I append his description.* I have only seen two specimens of what I take to be females in Colonel Swinhoe's collection, one from the Annamalai Hills, Travancore, one from Ceylon; the latter is marked "*Cyaniris akasa*, Horsfield, ♂" in Mr. Moore's handwriting. These specimens have broader wings than the males, the white area on the upperside of both wings more extensive, no blue gloss, and the marginal blackish dots on the hindwing obsolete. In both sexes the broad outer black margin to the forewing on the upperside ends in the middle of the submedian interspace, being continued to the anal angle by a narrow black anteciliary line, exactly as in the male of *C. albocæruleus*. *C. akasa*, as far as is known at present, has a very restricted range, being confined to the hills of South India, to Ceylon, Java, and Sambawa. On the Nilgiris Mr. G. F. Hampson says it is confined to the plateau, where it is very common at 6,000 to 8,000 feet.

675. Cyaniris vardhana, Moore.

Polyommatus vardhana, Moore, Proc. Zool. Soc. Lond., 1874, p. 572, pl. lxvi, fig. 5, *male*; *Cyaniris vardhana*, id., l. c., 1882, p. 244; id., Butler, l. c., 1886, p. 367, n. 44; idem, id., Ann and Mag. of Nat. Hist., sixth series, vol. i, p. 147, n. 49 (1888).

HABITAT: Western Himalayas.

EXPANSE: ♂, 1·5 to 1·6; ♀, 1·4 to 1·7 inches.

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* "MALE. UPPERSIDE, *both wings* white. *Forewing* with the base, costal and exterior borders to near the posterior angle broadly dusky brown, and a very faintly indicated slender disco-cellular streak. *Hindwing* with the base of costal border brown, base of abdominal border brownish-grey, a delicate brown outer marginal line and a row of very small indistinct spots. UNDERSIDE, *both wings* white. *Forewing* with a slender blackish disco-cellular streak, a curved discal series of five or six waved short linear streaks, and a marginal row of indistinct small spots. *Hindwing* with three subbasal black spots, and a discal curved series of irregular-shaped spots. FEMALE. UPPERSIDE, *forewing* with the brown marginal band diffused along the posterior border, where it is slightly glossed with blue, the white disc also being blue-glossed. *Hindwing* with the brown costal band and exterior marginal line and spots more distinct, the abdominal border also more distinctly glossed with blue. *Legs* with black bands; *palpi* black above and fringed with black beneath." (*Moore*, l. c.)

DESCRIPTION : "MALE. UPPERSIDE, *both wings* greyish-blue, with a pinkish gloss, veins exteriorly, and marginal line black, a narrow black disco-cellular streak very prominent on the forewing, a broad band of dark bluish-purple along anterior and exterior margins of forewing and anterior margin of hindwing. *Cilia* white, alternating with black on the forewing. UNDERSIDE, *both wings* bluish-white. *Forewing* with a prominent black disco-cellular streak, and a curved discal series of five spots, the upper spots small and disposed obliquely before the apex, the three lower spots large. *Hindwing* slightly powdered with blue at the base, a discal series of black dots, a dot within the cell, and a more prominent spot near base of anterior margin, a small black lunule on anal margin. FEMALE. UPPERSIDE, *forewing* with the disc pale bluish-white. *Hindwing* with indistinct dusky spots on the margin." Otherwise as in the male, but the spots of the underside more prominent. Both wings are much broader, and the outer margin of the forewing is much more convex than in the male. (*Moore*, l. c.)

C. vardhana is one of the largest, most beautiful, and easiest recognised species of the genus. It has no near ally, and it can be compared to no species known to me. The paucity of markings on the underside of the forewing and their great prominence is a very remarkable feature. It seems to be common nowhere. I have taken it sparingly at Mashobra near Simla. Dr. E. R. Johnson has taken it on Jakko in Simla itself; it was originally described from Jako, valley of the Rupin river, in Busahir; Major Yerbury has taken it at Murree in August and September, at Thundiani on 6th September, at Kali Pani on 11th October; Mr. W. Doherty records it from Jagheswar, 7,500 feet, Kumaon, rare; and Colonel Lang states that it occurs at Naini Tal from 5,500 to 8,500 feet (Cheena) in May and June and again in September. Murree may be taken as its westernmost and Naini Tal its easternmost range as far as is at present known.

676. **Cyaniris marginata**, de N.

C. marginata, de Nicéville, Journ. A. S. B., vol. lii, pt. 2, p. 70, n. 7, pl. i, fig. 9, *male* (1883); id., Moore, Proc. Zool. Soc. Lond., 1883, p. 523, pl. xlviii, fig. 6, *male*; id., Doherty, Journ. A. S. B., vol. lv, pt. 2, p. 134, n. 186 (1886).

HABITAT : Naini Tal; Dhankuri, Khati, 7,000 to 10,000 feet, Kumaon; Nepal; Sikkim; Upper Burma.

EXPANSE : ♂, 1·37 to 1·45 inches.

DESCRIPTION : "MALE. UPPERSIDE, *both wings* highly iridescent deep lavender-blue. *Forewing* with the costal margin, including the upper half of the cell, and the outer margin, widely, especially at the apex, black; a patch of pure white scales on the disc outside the cell between the lower discoidal and first median nervules; a black disco-cellular streak. *Hindwing* with the costal and outer margins broadly black, including a submarginal lunular series of bluish marks, obsolete in some specimens except at the anal angle; a patch of pure white scales above the discoidal nervule. UNDERSIDE, *both wings* white, slightly tinted with blue. *Forewing* with a disco-cellular blackish streak, a discal series of six large very irregularly shaped and placed spots, a submarginal lunular line and marginal linear spots blackish; a black anteciliary line. *Hindwing* with three subbasal spots, a disco-cellular streak, and an irregular discal series of eight to ten spots; marginal markings as in the forewing. *Cilia* white on both wings on both sides." (*de Nicéville*, l. c.) "FEMALE. UPPERSIDE, *both wings* chiefly black. *Forewing* with the white area larger and clearer than in the male, extending from the first median to the lower discoidal nervule, and into the end of the cell, where it is indented from above; extreme base from cell to hind margin dull greenish-blue. *Hindwing* with a subapical white patch over three interspaces, a black spot between the third median and discoidal nervules, sometimes a streak across the end of the cell, a line of obscure whitish submarginal lunules; part of the disc between the white area and the abdominal margin dull bluish. UNDERSIDE, *both wings* like the male." (*Doherty*, l. c.)

The form of this species, which I have above described and figured, is the very dark one which occurs in Sikkim in the middle of the rains; the one which occurs in the dry-

season (spring and autumn) differs very considerably: the white area on the upperside of both wings is of greater extent, the black costal, apical and outer margins are about half as wide, the hindwing has the costal area alone black, the outer margin with a series of connected lunules, a series of small black dots beneath these, and a fine anteciliary black line. All the black spots on the underside of both wings are very much less prominent and smaller than in the wet-season form. In Sikkim there is a fresh brood on the wing at the end of February, and perfect specimens are to be met with throughout the rest of the year. Mr. Doherty has described the female as above, but I can find no character by which to distinguish it from that of *C. puspa*, Horsfield. Mr. Moore has also described the female, but I am unable to identify it from his description. The male of *C. marginata* is easily distinguished, as, except *C. akasa*, Horsfield, *C. vardhana*, Moore, and *C. melæna*, Doherty, it is the only species which has the costal area on the upperside of the forewing in the male broadly black.

Colonel Lang states that *C. marginata* occurs "rarely in Naini Tal from 5,500 to 6,500 feet, June, August, and September." The species has a very limited range, occurring in the Himalayas from Kumaon to Sikkim, reappearing in Upper Burma. In the Phayre Museum, Rangoon, is a male from Fort Stedman.

As both Mr. Moore and I described this species about the same time, I append his description for reference.*

677. **Cyaniris melæna,** Doherty.

C. melæna, Doherty, Journ. A. S. B., vol. lviii, pt. 2, p. (1889).

HABITAT: Tenasserim Valley, Burma.

EXPANSE: ♂, 1·1 to 1·2 inches.

DESCRIPTION: "MALE. UPPERSIDE, *both wings* dark dull blue, resplendent in some lights; no whitish patch. *Forewing* has the blue extending over less than half the surface, sometimes extending above the upper discoidal nervule beyond the cell, the black area very large, occupying the upper part of the cell, widening at the anal angle, and extending over more than a third of the inner margin. *Hindwing*, the blue occupies hardly more than a third of the surface, and does not approach either the costal or abdominal margin. *Cilia* whitish. UNDERSIDE, *both wings* grey-white, with a slight silvery lustre. *Forewing* with a streak across the end of the cell; a curved discal line of six dark streaks set in paler rings, the second, third, fourth, and fifth outwardly oblique, the fifth and sixth removed inwardly; a submarginal row of joined ocellus-like spots, consisting of a dark lunule, enclosing a pale dark-pupilled spot; a marginal dark line. *Hindwing* with three distinct basal spots, a streak across the end of the cell, a very irregular series of discal spots, the first very large and black near the costa, the second minute near the first but more basal, the next four forming an oblique crescent (the fifth small, the sixth larger, nearest the base), the seventh large, removed outwardly, the eighth (between the submedian and the internal nervures) smaller and nearer the base; the submarginal ocelli are as in the forewing, the inner lunular line more serrate. FEMALE unknown."

"This species, which is the darkest *Cyaniris* known, was taken in the Tenasserim Valley in February, but in the rains it is perhaps confined to higher lands. An apparently identical species is found in the Malay Peninsula at a considerable height, and seems to be *C. jynteana*, Distant (*nec* de Nicéville)." Mr. Doherty may be correct in identifying his *C. melæna* with the specimen described and figured by Mr. Distant as *C. jynteana*, and judging by the markings of the underside and the width of the black border of the forewing on the upperside in Distant's figure, I think he is right; to set against this is the fact that Mr. Moore identified Mr. Distant's specimen for him, recognised it as his own species, which he is hardly likely to have done

* "Allied to *C. puspa*, Horsfield. MALE. UPPERSIDE, *both wings* with the black marginal borders twice the width of those in *C. puspa*, the upper discal area also more prominently white. *Forewing* with the black costal border extending its width half across the cell. FEMALE. UPPERSIDE, *both wings* darker than in the same sex of *C. puspa*, the pale discal area of less width. UNDERSIDE, *both wings* similarly marked." (*Moore*, l. c.) The above description evidently applies to the rains form of this species.

had he had the very distinct *C. melæna* before him. There is a very palpable error somewhere, but I am unable to clear it up.

"The genus *Cyaniris* is better represented in the tropics than is generally supposed. I have myself taken ten species, including *C. haraldus*, Fabricius, in the Malay Peninsula, eight confined to high elevations; also seven in the mountains of Eastern Java, and four in Celebes, besides *C. duponchelii*, Godart (? = *C. puspa*, Horsfield)* in Sumba and Sambawa, and *C. akasa* in Sambawa at 4,500 feet elevation." (*Doherty*, l. c.)

C. melæna appears to be nearest to, but amply distinct from, *C. marginata*, de Nicéville; it is considerably smaller, has no white patches on the upperside of either wing, and the iridescent blue coloration is almost invisible in some lights, highly resplendent in others. The markings of the underside are smaller and more regular than in the rains form of *C. marginata*. The hindwing differs in shape from any *Cyaniris* known to me, the outer margin being decidedly truncated. In the Phayre Museum, Rangoon, is a male of this species taken at Myitta, in the Tenasserim valley, in March.

678. Cyaniris albocæruleus, Moore.

Polyommatus albocæruleus, Moore, Proc. Zool. Soc. Lond., 1879, p. 139; *Cyaniris albocæruleus*, de Nicéville, Journ. A. S. B., vol. lii, pt. 2, p. 71, n. 8, pl. i, figs. 4, *male*; 4*a*, *female* (1883).

HABITAT: Simla; Masuri; Dehra Doon; Naini Tal; Khati, N.-W. Kumaon, 7,000 feet; Nepal; Sikkim.

EXPANSE: ♂, 1·12 to 1·50; ♀, 1·35 to 1·40 inches.

DESCRIPTION: "MALE. UPPERSIDE, *both wings* pure pearly white. *Forewing* with the outer margin broadly at the apex and decreasingly towards the hinder angle dusky black, this black border being reduced to a very fine black line at the hinder angle; the base, broadly along the costa and inner margin and within the outer black band pale clear shining blue, thus leaving a patch of the white ground-colour on the disc of the wing only. *Hindwing* with the base and abdominal half of the wing irrorated with very pale shining blue; the spots of the underside showing through slightly on the disc; an indistinct marginal series of dusky spots, and a fine anteciliary black line. UNDERSIDE, *both wings* white, slightly tinted with blue. *Forewing* with a slender blackish disco-cellular streak, a curved discal series of five or six elongate spots, and a marginal series of very indistinct small spots, obsolete at the hinder angle. *Hindwing* with ten or eleven small dusky spots, of which three are subbasal, the rest arranged irregularly across the disc; a submarginal series of small spots, and a fine marginal black line. FEMALE. UPPERSIDE, *forewing* with the costal and outer borders very broadly dusky black, the discal patch white, the inner margin broadly irrorated with blue. *Hindwing* with the discal area between the nervules bluish-white, all the rest dusky; a submarginal series of oval dusky spots, and the marginal black line. UNDERSIDE, *both wings* exactly as in the male. *Cilia* white on both sides in both sexes."

"Nearly allied to *Cyaniris akasa*, Horsfield, from which (*apud* Moore in 'Lep. Cey.') the male differs on the upperside of the forewing having no dusky on the base and costal margin, and the outer black border being narrower throughout."

"Two males were taken by me in the bed of the Simla river on the 26th October and 2nd November, 1879, respectively, and one female also at Simla, but the exact locality and date were not recorded. All three specimens are quite perfect; the males agree absolutely except in size. I also took one male in Sikkim in October at about 3,500 feet elevation."

"Mr. Moore seems to have described the female of some other species as the female of *C. albocæruleus*, as he states that in that sex the broad outer marginal black band on the upperside of the forewing does not reach the posterior angle, whereas in my female the band is very wide at that point. As the undersides of both sexes of the specimens

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* Dr. Horsfield says that *C. duponchellii*, Godart, from Timor, differs from *C. puspa*, Horsfield, "by the deep azure tint diffused over its upper surface, and by the number and arrangement of the ocellated spots underneath." (Cat. Lep. E. I. Co., p 68 (1828). Professor Westwood (Gen. Diurn. Lep., vol. ii, p. 491, n. 60 (1852) records *Lycæna duponchellii* from Timor, Papua, Bengal, Java, Amboyna, and he retains *L. puspa* as distinct, recording it from East India, Ceylon, Java. (l. c., n. 56).

described above agree absolutely, I think I have correctly paired them, while, if the female of this species be variable, Mr. Moore's description would be correct." (*de Nicéville*, l. c.) Females from Masuri and Sikkim since obtained agree also with my description of that sex, and not with Mr. Moore's. Colonel Lang reports *C. albocæruleus* from "Naini Tal, 5,500 to 8,600 feet (Cheena), May, and again August to October." Mr. Doherty records it from "Khati, N.-W. Kumaon, 7,000 feet, rare." It occurs rarely in Sikkim in March, April, May, October, November, and December. It has a rather more extended range than *C. marginata*, mihi, as it occurs to the west as far as Simla at any rate. I am unaware, or have failed to recognise, that there is any seasonal dimorphism in this species. It is a rare species, but is very easily recognised.

I append as a foot-note Mr. Moore's original description of this species.*

679. **Cyaniris transpectus**, Moore. (PLATE XXVI, FIGS. 170, ♂ WET-SEASON FORM; 171, ♂ DRY-SEASON FORM).

Polyommatus transpectus, Moore, Proc. Zool. Soc. Lond., 1879, p. 139; *Cyaniris transpectus*, de Nicéville, Journ. A. S. B., vol. lii, pt. 2, p. 70, n. 6, pl. i, fig. 6, *male*; 6*a*, *female* (1883).

HABITAT: Sikkim; Khasia Hills, Eastern Bengal; Myitta, Tenasserim valley.

EXPANSE: ♂, ·95 to 1·40; ♀, 1·20 to 1·35 inches.

DESCRIPTION: "MALE. UPPERSIDE, *both wings* lavender-blue. *Forewing* with the costal margin somewhat broadly, and the outer margin very broadly, especially at the apex, dusky black; a patch of irrorated white scales on the disc between the third median nervule and the submedian nervure, obsolete in some specimens. *Hindwing* with a broad even outer black border, somewhat divided by a series of bluish lunules, which are most prominent at the anal angle, and often enclose black spots. UNDERSIDE, *both wings* white, slightly tinted with blue. *Forewing* with a slender dusky disco-cellular streak, a discal series of six elongate spots, arranged in a regular sinuous line in some specimens (as in the female figured), or in others more irregularly (as in the male figured); a submarginal lunular line, a marginal series of linear spots, and a fine anteciliary line. *Hindwing* with the spots arranged as in *C. puspa*, Horsfield, but they are less prominent, those on the margin reduced to linear marks. *Cilia* white on both sides in both sexes. FEMALE. UPPERSIDE, *both wings* very deep blue, almost black. *Forewing* with a broad pure white patch from near the subcostal nervure to the inner margin, a prominent disco-cellular streak, and the base thickly irrorated with deep blue scales. *Hindwing* with the outer margin rather less deeply blue than in the forewing, and bearing a series of pale lunules including black spots, the disc white but irrorated towards the abdominal margin with blue scales, as is also the base of the wing. In some specimens the white area on both wings is much restricted, appearing on the hindwing only at the middle of the costal margin. UNDERSIDE as in the male." (*de Nicéville*, l. c.)

I have figured and described as above the form of both sexes of this species which occurs in Sikkim in the rains. The form which is found in the spring and autumn (dry-season) differs very considerably: in the male the blue coloration of the upperside of the male is much lighter and less purple, and the costa, apex, and outer margin are very narrowly black. The forewing has a patch of white on the disc quite as large as in *C. albocæruleus*, Moore, and it reaches the inner margin. The hindwing has a large patch of white from the apical half of the costa to the middle of the wing; all the rest of the surface is powdered with blue scales, and is crossed by the darker veins; there is a fine anteciliary black line, but no broad outer black border as in the rains form. All the spots on the underside of both wings are much less prominent. The female differs quite as much. The base, apex, and outer margin are less broadly black, leaving a pure white discal patch twice as large as in the

* "MALE and FEMALE. UPPERSIDE, *both wings* pale clear blue, discal area of the *forewing* and apical area of the *hindwing* white. *Forewing* with a broad outer marginal black band terminating in a point at the posterior angle in the male, but not reaching the angle in the female. *Hindwing* with a narrow marginal black line and a series of small indistinct spots, the latter still less apparent in the female. *Cilia* white, with an inner bordered line adjoining the band on the forewing. UNDERSIDE, *both wings* white, with small and slender black markings disposed similarly to those in *P.* [=*C.*] *puspa*, Horsfield, but without the lunular line encompassing the marginal spots." (*Moore*, l. c.)

rains form, and the disco-cellular nervules are marked with a black line. The hindwing has the base powdered with dusky and blue scales, there is a submarginal dusky lunular fascia, enclosing a series of prominent black spots, and an anteciliary black fine line. Underside of both wings with the spots small or obsolete. The female of this species is easily recognised from all others by having no blue iridescent scales towards the base of the wings on the upperside. It occurs commonly in Sikkim in March, April, May, September, October, and November. Its range is from Sikkim eastwards through Assam to Burma. I append as a footnote Mr. Moore's original description of this species.*

Figure 170 shews both sides of a male specimen of the wet-season form ; fig. 171 shows both sides of a male specimen of the dry-season form, both from Sikkim and now in my collection.

680. **Cyaniris latimargo**, Moore.

C. latimargo, Moore, Proc. Zool. Soc. Lond, 1883, p. 523, pl. xlviii, fig. 9, *male*.

HABITAT : Sikkim, N.-E. Bengal.

EXPANSE : ♂, 1·25 inches.

DESCRIPTION : "Allied to *C. transpectus*, Moore. MALE. UPPERSIDE, *both wings* of a darker blue, with a purplish tint, with a broad black outer marginal band of one-eighth inch in width ; the costal borders also black-bordered. *Hindwing* with the abdominal margin black-bordered. UNDERSIDE, *both wings* with similarly disposed but broader markings than those in *C. marginata*." (*Moore*, l. c.)

Mr. Moore informs me in a letter that he has this species from Sikkim. I have not been able to recognise it with certainty, but I am almost sure that it is the rains form of *C. transpectus*. Mr. Moore says that the costal border of the forewing is black-bordered. If it is so, it must be but narrowly black ; it is prominently black in four species only, at least as far as I know, *C. akasa*, *C. vardhana*, *C. marginata*, and *C. melæna*.

681. **Cyaniris puspa**, Horsfield.

Polyommatus puspa, Horsfield, Cat. Lep. E. I. Co., p. 67, n. 3 (1828); *Cyaniris puspa*, Moore, Proc. Zool. Soc. Lond., 1882, p. 245 ; id., de Nicéville, Journ. A. S. B., vol. lii, pt. 2, pl. i, fig. 5*a*, *female* (1883) ; id., Butler, Ann. and Mag. of Nat. Hist., fifth series, vol. xvi, p. 335, n. 70 (1885) ; *Lycæna puspa*, var. Felder, Verh. zool.-bot. Gesells. Wien, vol. xviii, p. 282 (1868) ; *Polyommatus lavendularis*, Moore, Ann. and Mag of Nat. Hist., fourth series, vol. xx, p. 341 (1877) ; *Cyaniris lavendularis*, id., Lep. Cey., vol. i, p. 75, pl. xxxiv, figs. 6, 6*a*, *male* ; 7, *female* (1881) ; *C. puspa*, var. *lilacea*, Hampson, Journ. A. S. B., vol. lvii, pt. 2, p 356, n. 91 (1888).

HABITAT : Almost throughout India, (except the desert tracts), the outer Himalayas Assam, Burma, Ceylon, the Andaman Isles, and Java.

EXPANSE : ♂, 1·1 to 1·5 ; ♀, 1·2 to 1·4 inches.

DESCRIPTION : "MALE. UPPERSIDE, *both wings* blue with a defined border of blackish-brown, and a large white patch on the disc ; a deeper tint extends from the base to the edge of the brown margin, varying according to the direction of the light, being either intensely azure or diluted, and transmitting a ground-colour of brown. UNDERSIDE, *both wings* white with a bluish cast, with, along the posterior margins, two parallel brown strigæ, of which the interior is undulated, enclosing an interrupted series of oblong brown spots, gradually assuming a deeper tint as they approach the anal angle ; interior of this follows a macular band, originating by two successive ocellate dots, from the margin of the forewing and extending in an irregular curve through both pair. *Forewing* bears on the disc a short curved streak. *Hindwing* with a similar angular mark, but more obscure ; with, in its basal portion, numerous black ocellate spots bordered with white, of which five are more prominent ; two of these stand near the exterior margin, the apical one being larger and of a more florid tint ; two, less conspicuous, are disposed near the anal interior margin, and a fifth intermediate

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* MALE. UPPERSIDE, *both wings* blue, with a broad outer marginal black band, broadest at the apex of the *forewing* ; the band on the *hindwing* maculated. UNDERSIDE, *both wings* white, with indistinct slender dusky markings disposed as in *P.* [= *C.*] *puspa* ; the costal spot only prominent and visible above." (*Moore* l. c.) This description appears to apply best to the dry-season form of this species.

not far from the base. *Antennæ* annulated with white. Tufts of greyish-blue hairs at the sides of the *thorax* and *abdomen*. FEMALE. UPPERSIDE, *both wings* with the blue colour confined to the base." (*Horsfield*, l. c.)

C. puspa in Sikkim does not exhibit quite as great a seasonal dimorphism as obtains in *C. transpectus*, Moore, and *C. marginata*, de Nicéville. In the rains form the coloration of both wings on the upperside is of a deeper purple-blue than in the dry-season form; there is hardly any white discal patch, while in the dry-season form this is as large as in the rains form of *C. marginata*; the costal and outer margins are also more broadly black in the rains form. The hindwing in the rains form has a moderately wide outer black border, with the inner edge lunulated; this border, in the dry-season form, is reduced to a series of oval marginal black spots, followed by a fine black anteciliary line. The markings of the underside of both wings are fully twice as prominent in the rains form.

C. puspa is probably the commonest and most widely ranging species of the genus occurring in India, and, except in Sikkim, where the changes of season are very great, it is fairly constant. It is somewhat rare in the outer ranges of the Western Himalayas, becoming more plentiful eastwards; in Sikkim it is one of the very commonest "blues" met with. It occurs eastwards as far as Sibsagar in Upper Assam, also in Burma and in the Andaman Isles. On the continent of India I have taken it in the Beerbhoom district; it occurs on Parisnath, at Khandalla on the Western Ghâts, in North Kanara, in Orissa, Ganjam, in the Nilgiris, Rutnagherry, Cannanore, and in Ceylon. Mr. Moore has separated off the Ceylon form under the name of *lavendularis*. I have a very large series of this form before me, and cannot find a single character by which it can be distinguished from the ordinary Indian form of *C. puspa*. Mr. Moore has figured a specimen in his "Lepidoptera of Ceylon" as the female of his *C. lavendularis*, which certainly is not the opposite sex of that species, nor does it look to me like a female at all. What it really is I cannot say. I append a description of *C. lavendularis*.* Dr. Felder distinguishes this form from Ceylon as follows: "Differing from the Bengal form [of *C. puspa*] by the blackish-fuscous border of the forewing [on the upperside] being almost narrower by half, and the spots before the margin of the underside being smaller." (*Felder*, l. c.) Mr. E. E. Green informs me that he has bred *C. lavendularis* in Ceylon, and that the larva feeds upon the young leaves of *Hiptage madablota*.

Mr. Hampson has described (l. c.) a variety of *C. puspa*, which he calls *lilacea*, as follows: "HABITAT: Southern slopes of the Nilgiris, and the Nellyampathy Hills, Cochin. MALE. UPPERSIDE, *both wings* with no white on the disc. UNDERSIDE, *both wings* as in the typical *C. puspa*, Horsfield. FEMALE. UPPERSIDE, *both wings* with the whole white discal area suffused with blue, more especially towards the base. The seasonal broods do not differ." He also records *C. puspa* and *C. lavendularis* from the Nilgiris.

C. lambi, Distant, from the Malay Peninsula and Nias Island is indistinguishable absolutely from the dark rains form of *C. puspa* from Sikkim. In any future revision of the genus it should, I think, be placed as a synonym of that species. It agrees with *C. puspa*, var. *lilacea*,

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* *Cyaniris lavendularis*, Moore. *Polyommatus lavendularis*, Moore, Ann. and Mag. of Nat. Hist., fourth series, vol. xx, p. 341 (1877); *Cyaniris lavendularis*, id., Lep., Cey., vol. i, p. 75, pl. xxxiv, figs. 6, 6*a*, *male*; 7, *female* (1881). HABITAT: Ceylon. EXPANSE: *Male*, 1·1 inches; *female*, 1·3 inches. DESCRIPTION: "MALE. UPPERSIDE, *both wings* dark lavender-blue, with an extremely narrow black outer marginal border. UNDERSIDE, *both wings* greyish-white. *Forewing* with a dusky-black streak at the end of the cell, a discal series of oblique spots, and a marginal row of small spots enclosed by a dentated line. *Hindwing* with three black subbasal spots, some specimens with a smaller spot at the base of the subcostal nervure and another at the base of the first median nervule, a curved series of seven discal spots, and a marginal row of spots enclosed by a dentate line. FEMALE. UPPERSIDE, *both wings* paler than in the male, and of a purple lavender-blue. *Forewing* with the base of the costa and an outer band black. *Hindwing* with black anterior border and marginal row of prominent pale-bordered black spots. *Cilia* white, with inner black border." UNDERSIDE as in the male.

"'Allied to *P.* [= *C.*] *puspa*, Horsfield, differs from Java specimens above in its uniform colour and narrower black borders.' (*Moore*, l. c. in Lep. Cey.)

In all the specimens from Ceylon of this species that I have seen, there is a medium-sized patch of white irrorations on the disc of both wings which is not mentioned by Mr. Moore, though he refers to them in describing *C. placida* (*vide* p. 104, foot-note). The outer black borders to both wings on the upperside of the male cannot be called "extremely narrow," in fact there are not many Indian species which have them as broad. As figured they are quite as broad as is usual in *C. puspa*. As stated above, his description of the female does not apply to the female of this species.

Hampson, in having no white discal patches on the upperside of both wings in the male. Its description is given below.*

682. **Cyaniris chennellii**, de N.

C. chennellii, de Nicéville, Journ. A. S. B., vol. lii, pt. 2, p. 72, n. 9, pl. i, fig. 10, *male* (1883).

HABITAT: Shillong, Assam.

EXPANSE: ♂, 1·10 to 1·25; ♀, 1·20 inches.

DESCRIPTION: "MALE. UPPERSIDE, *both wings* lavender-blue. *Forewing* with the outer margin widely dusky-black, widest at the apex; a dusky disco-cellular streak. *Hindwing* with the costal and outer margins widely dusky-black. UNDERSIDE, *both wings* pale grey. *Forewing* with a slender disco-cellular streak outwardly defined with whitish, a discal slightly sinuous series of six small rounded spots also outwardly defined with whitish; very pale and indistinct submarginal lunular line, marginal linear spots, and anteciliary line. *Hindwing* with two subbasal small black spots, a faint disco-cellular streak, and an irregular discal series of nine black spots outwardly defined with whitish, of which the third, fourth and fifth from the costa are much paler; marginal markings as on the forewing. *Cilia* of both wings somewhat dusky on the upperside, concolorous with the wings on the underside." (*de Nicéville*, l. c.) FEMALE. UPPERSIDE, *forewing* dusky-black, with a small discal iridescent bluish-purple patch on the disc, a prominent disco-cellular black streak. *Hindwing* blackish, the lower discal area streaked with bluish-purple between the veins, and a submarginal series of oval black spots between the veins reaching the discoidal interspace; the one in the submedian interspace geminate, each spot surrounded with a bluish line. *Cilia* of the forewing dusky, whitish on the hindwing, with an anteciliary black line. UNDERSIDE, *both wings* as in the male.

From Shillong specimens of the female of *C. jynteana*, mihi, I can at once distinguish the same sex of *C. chennellii* by the blue discal patch on the upperside of the forewing being much darker, in *C. jynteana* it is almost pure white in some lights; and on the underside the discal spots of the forewing are arranged in a regularly sinuous line and are six in number; in *C. jynteana* they are five only, and the anterior one is much out of line, being much nearer to the base of the wing, and all are placed angle to angle; moreover in *C. jynteana* the spots are elongated, while in *C. chennellii* they are quite round.

As far as I am aware, *C. chennellii* is confined to Shillong. It is a well-marked, easily distinguished species. It probably occurs throughout the warm months. I have specimens taken by Dr. E. R. Johnson and the Rev. Walter A. Hamilton in March, May and September.

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* *Cyaniris lambi*, Distant. *Polyommatus (Cyaniris) lambi*, Distant, Ann. and Mag. of Nat. Hist., fifth series, vol. x, p. 245 (1882); *Cyaniris lambi*, id., Rhop. Malay., p. 211, n. 1, pl. xxi, fig. 22, *male* (1884). HABITAT: Province Wellesley, Perak, Sungei Ujong, Malacca, Nias Island. EXPANSE: *Male* and *female*, 1·2 to 1·4 inches. DESCRIPTION: "MALE. UPPERSIDE, *both wings* somewhat dark lavender-blue. *Forewing* with the costal area and outer margin somewhat broadly fuscous, widest at base and apex. *Hindwing*, with the costal, posterior, and abdominal margins somewhat broadly fuscous. UNDERSIDE, *both wings* greyish-white. *Forewing* with the costal area and outer margins slightly infuscated, and with the following pale fuscous spots:—a transverse linear one at the end of the cell, one between the third and fourth subcostal nervules, one above the upper discoidal nervule, three in linear series and nearer the outer margin, divided by the lower discoidal and third median nervules, and two larger, and placed more inwardly, divided by the first median nervule; obscure, waved and broken submarginal and marginal pale fuscous fasciæ. *Hindwing* with seven large and prominent black discal spots—one, small, between bases of costal and subcostal nervures, followed by two which are more rounded and much larger, one in the cell at about the base of the first median nervule, near which is a smaller spot, contiguous, but outside the cell, and two situated on the abdominal margin; these are followed by a discal series of six pale fuscous spots, the first and innermost of which is situated between the subcostal nervules near their base, second and third un each side of the discoidal nervule, aud fourth, fifth and sixth in irregular series, separated by the second and first median nervules; a transverse pale fuscous fascia at the end of the cell, and a much-waved pale fuscous submarginal fascia, between which and the outer margin are nine marginal spots, the upper four of which are pale fuscous, and the remaining five almost black. *Body* and *legs* more or less concolorous with the wings. FEMALE. UPPERSIDE, *forewing* fuscous, with a pale greyish-white discal space much suffused with bluish, extending from near the base through the middle of the cell above to about the median nervure beneath, and outwardly reaching the middle of the submedian nervules. *Hindwing* pale fuscous, with a similar but smaller pale discal area as on the forewing, and with the posterior margin fuscous as in the male. UNDERSIDE, *both wings* as in the other sex."

"*C. lambi* is most nearly allied to the Ceylonese species *C. lavendularis*, Moore." (*Distant*, l. c. in Rhop. Malay.) I have seen two male specimens of this species from the Malay Peninsula.

683. **Cyaniris albidisca,** Moore.

C. albidisca, Moore, Proc. Zool. Soc. Lond., 1883, p. 524, pl. xlviii, fig. 7, *male*; *id.*, Swinhoe, l. c., 1885' p. 133, n. 65.

HABITAT : Nilgiri, Annamalai and Pulni Hills, S. India ; Poona, January (*Swinhoe*).

EXPANSE : ♂, 1·25 to 1·40 ; ♀, 1·3 to 1·5 inches.

DESCRIPTION : "Allied to *C. puspa*, Horsfield. MALE. UPPERSIDE, *both wings* with a prominent white discal patch. *Forewing* dark blue, with a narrow black marginal band decreasing to a point at posterior angle. *Hindwing* with a narrow black, slightly macular, marginal band. UNDERSIDE, *both wings* white, with similarly disposed but more slender and less prominent markings than those in *C. puspa*." (*Moore*, l. c.)

C. albidisca appears to be absolutely restricted to the hills of South India. Colonel Swinhoe records it from Poona, but his specimens which are now before me appear to me rather to be females of *C. puspa*. *C. albidisca* is by no means easy to recognise where it and *C. puspa* occur together, as in the Nilgiris, but in the male the white patches on the upperside of both wings are better defined, the outer black borders are narrower (as narrow as in the dry-season form of *C. puspa* in Sikkim), and the markings of the underside more attenuated. The female has the blue gloss on the upperside less brilliant than in that of *C. puspa*, and the white patches larger. The markings of the underside are more prominent than in the male. I possess *C. albidisca* from the Nilgiri and Pulni Hills only ; Colonel Swinhoe possesses a male from the Annamalai Hills.

684. **Cyaniris cyanescens,** n. sp. (FRONTISPIECE, FIG. 129 ♂).

HABITAT : Nicobar Isles.

EXPANSE : ♂, 1·2 ; ♀, 1·1 to 1·3 inches.

DESCRIPTION : MALE. Nearest to *C. jynteana*, de Nicéville. UPPERSIDE, *both wings* differ in the blue colour being of a much deeper, richer and more iridescent shade. *Forewing* with the outer black margin somewhat narrower. UNDERSIDE, *both wings* purer white. *Forewing* with the discal series of spots placed very irregularly ; anteriorly there is a spot, sometimes two, placed obliquely, below the costa, then three arranged in a straight line near the outer margin, then two placed nearer the base of the wing but arranged obliquely ; the usual marginal markings and disco-cellular streak. *Hindwing* with the three subbasal spots, the one on the middle of the costal margin and the one on the middle of the abdominal margin very distinct and black, as are also all the submarginal spots ; the usual irregular discal series pale fuscous, a marginal series of increasing round black spots, with an inner lunulated line. FEMALE. UPPERSIDE, *both wings* blackish. *Forewing* with the disc whitish, glossed with brilliant iridescent blue in some lights, a distinct disco-cellular spot. *Hindwing*, with the costa broadly blackish, the disc as in the forewing, a submarginal series of blackish oval spots, inwardly defined by a blue then a distinct lunulated blackish line. UNDERSIDE as in the male.

The late Mr. A. R. de Roepstorff obtained three males and two females of this species on Kamorta, one of the Nicobar Isles.

The figure shows both sides of the type male specimen in the Indian Museum, Calcutta.

Local race *prominens*, nov. FEMALE. UPPERSIDE, *forewing* with the blue area more extensive. *Hindwing* with the marginal spots much larger and blacker. UNDERSIDE. *Hindwing* with all the markings much larger and more prominent, especially the spot just beyond the middle of the costa, and the marginal round spots, which are inwardly defined by a distinct narrow lunulated fuscous line ; the discal spots arranged in a regular sinuous band. EXPANSE : ♀, 1·3 inches.

A single specimen obtained by Mr. E. H. Man on Little Nicobar.

685. **Cyaniris placida,** de N.

C. placida, de Nicéville, Journ. A. S. B., vol. lii, pt. 2, p. 68, n. 3, pl. i, fig. 8, *male* (1883) ; id., Moore, Proc. Zool. Soc. Lond., 1883, p. 523. pl. xlviii, fig. 5, *male* ; id., Butler, Ann. and Mag. of Nat Hist., fifth series, vol. xvi, p. 334, n 69 (1885) ; id., Distant, Rhop Malay., p. 453, n. 4, pl. xliv, fig. 7, *male* (1886).

HABITAT : Sikkim ; Khasi Hills ; Sibsagar, Upper Assam ; Myitta, Tenasserim Valley ; Penang.

EXPANSE : ♂, 1·1 to 1·4 inches.

DESCRIPTION: "MALE. UPPERSIDE, *both wings* rather deep lavender-blue. *Forewing* with the costa very narrowly, and the outer margin more widely, but decreasingly, to the hinder angle black. *Hindwing* with the outer margin narrowly black, the inner edge of the black border lunulated, sometimes reduced to black spots between the nervules, and a black anteciliary line. UNDERSIDE, *both wings* white, slightly tinted with blue. *Forewing* with a fine disco-cellular streak defined outwardly with whitish; a discal series of five or six more or less irregularly shaped and placed spots; a submarginal lunulated line, marginal spots and anteciliary line. *Hindwing* with three subbasal black spots; a faint slender disco-cellular line; a discal very sinuous series of eight spots, the upper one on the costa and the lower on the abdominal margin deep black and the most distinct; marginal markings as on the forewing. *Cilia* white on both sides."

"Next to *C. puspa*, Horsfield, this species seems to be the commonest *Cyaniris* in Sikkim; I took it at various elevations in October, and Mr. Otto Möller has taken it in large numbers in the spring. The males are very constant, but I have not seen the female."

"*C. placida* is very close to, if not identical with, the *Lycæna cagaya* of Felder (Reise Novara, Lep., vol. ii, p. 278, n. 347, pl. xxxiv, figs. 11, 12, *male*; 13, *female*, 1865, from Luzon). In *C. cagaya* the marginal spots on the upperside of the hindwing in the male are more prominent than in *C. placida*." (*de Nicéville*, l. c.)

This species appears to be very constant in Sikkim. I have seen a few specimens of the male which have an irrorated discal white patch on the upperside of the forewing. Mr. Möller has Sikkim specimens taken in March, May, and October. I am still unable to identify the female. Its range appears to be from Sikkim eastwards to Upper Assam, reappearing in Upper Burma, where Mr. Doherty obtained it, and at Penang. There is also a male specimen in the Phayre Museum, Rangoon, from Syinbyudine, on the Tavoy-Siam frontier, taken in December. I append as a footnote Mr. Moore's description of this species.*

686. **Cyaniris jynteana**, de N.

C. jynteana, de Nicéville, Journ. A. S. B., vol. lii, pt. 2, p. 69, n. 5, pl. i, fig. 7, *male*; 7a, *female* (1883); *C. jynteana*, Moore, Proc. Zool. Soc. Lond., 1883, p. 524, pl. xlviii, fig. 10, *male*; *C. jynteana*, var. Distant, Rhop. Malay., p. 452, n. 3, pl. xliv, fig. 6, *male* (1886).

HABITAT: Sikkim, Shillong, Khasia and Jyntea Hills, Malacca?

EXPANSE: ♂, 1·05 to 1·40; ·90 to 1·25 inches.

DESCRIPTION: "MALE. UPPERSIDE, *both wings* somewhat deep lavender-blue. *Forewing* with the outer margin widest at the apex, sometimes reduced to a point at the hinder angle, dusky black; an indistinct disco-cellular streak sometimes absent; and the disc between the median nervules just beyond the cell irrorated with white scales in some specimens. *Hindwing* with the outer margin dusky black, its inner edge lunulated. In some specimens the apical area is obscurely irrorated with white. UNDERSIDE, *both wings* pale grey. *Forewing* with a pale brown slender disco-cellular streak, a discal series of five similar spots, of which the upper one is much out of line, being placed nearer to the base of the wing; a submarginal lunulated line and marginal spots very pale brown; the usual fine anteciliary black line. *Hindwing* with three subbasal black spots; a slender brown disco-cellular streak; a very sinuous discal series of nine spots; marginal markings as on the forewing. FEMALE. UPPERSIDE, *forewing* with all but the middle of the disc (which is white, glossed with iridescent blue) black; a disco-cellular black spot. *Hindwing* blackish, white in the middle, glossed with blue, and along the veins irrorated with black scales; a submarginal series of pale lunules. UNDERSIDE, *both wings* marked exactly as in the male."

"The males differ in size, in the absence in some specimens of the white patch on the disc of the forewing on the upperside, and also in the width of the marginal black border,

* "Allied to *C. lavendularis*, Moore. MALE. UPPERSIDE, *both wings* of a darker but duller blue, and of a uniform tint throughout, *C. lavendularis* having the discal areas slightly whitish; marginal black borders similar but slightly narrower. UNDERSIDE, *both wings* similarly marked, except that in the *forewing* there are but four transverse discal spots, which are also disposed in a more linear series." (*Moore*, l. c.) The discal spots are very irregular in number, specimens with five and six spots are common from Sikkim.

which sometimes disappears at the hinder angle. The underside is very constant, all the spots and markings being very small and distinct." (*de Nicéville*, l. c.)

Mr. Distant has seen a single male only from Malacca, and writes regarding it: "Although this specimen differs from the typical form of the species by the darker colouring of the forewing, and especially by the brownish hue of the hindwing, it was yet identified without doubt by Mr. Moore himself as representing his *C. jynteana.* When one compares the figures of this species given by Messrs. Moore, de Nicéville, and myself, the difficulty of properly portraying the colour of these small *Lycænidæ* (either by hand-colouring or chromo-lithography) becomes painfully apparent. This difficulty, however, is scarcely detrimental to determination, for the markings beneath, *on which true identification depends*, will be seen to be uniform and unmistakable."

"Both Mr. Moore and Mr. de Nicéville seem to have described this species *under the same name* at about the same time. Mr. Moore's description, however, has priority, as the portion of the 'Journal of the Asiatic Society of Bengal' in which Mr. de Nicéville's contribution appeared, though bearing date 1883, was really delayed in publication till 1884." (*Distant*, l. c.) With regard to this latter statement, the following are the facts of the matter. Mr. Moore's paper, in which he describes *C. jynteana* and four other species also described by myself, was received 12th September, read 20th November, 1883, and issued 1st April, 1884. My paper was received and read 7th March, 1883, and issued 6th March, 1884. At every date, therefore, my paper has priority, though the essential one, that of publication, need only be considered, and even in this my paper has 25 days' advantage.

C. jynteana in Sikkim is distinctly dimorphic; my figures of the male and female apply to the rains form. The dry-season form of the male has the blue coloration of the upperside of both wings brighter, the discal white patches larger, and the outer black margin of the forewing narrower. The markings of the underside in the rains form being so very small, there is hardly any room for the dry-season form having them still smaller. The female of the dry-season form has the upperside of both wings more richly glossed with shining blue, the white patches larger, with a well-marked costal, apical, and outer black margin, and the black spot on the disco-cellular nervules very distinct on the forewing. The hindwing has the marginal lunular line and enclosed black spots more prominent. It is a fairly common species in Sikkim. Mr. Otto Möller possesses specimens taken in March, April, May, October, and November. Mr. Doherty is of opinion that the specimen of this species from Malacca described and figured by Mr. Distant is the *C. melæna* of Doherty (see page 97 *antea*). *C. jynteana* is probably confined to Sikkim and Assam. It is a very distinct and easily recognized species.

I append Mr. Moore's description of this species as a footnote.*

687. **Cyaniris sikkima**, Moore.

C. sikkima, Moore, Proc Zool. Soc. Lond., 1883, p. 524, pl. xlviii, fig. 11, *male*.

HABITAT: Sikkim.

EXPANSE: ♂, 1·2 inches.

DESCRIPTION: "Allied to *C. jynteana*, de Nicéville. *Forewing* shorter, *hindwing* also shorter and comparatively broader. UPPERSIDE, *both wings* with the marginal blackish band broader. *Forewing* with a slender blackish disco-cellular streak. UNDERSIDE, *both wings* similarly marked to *C. jynteana*, the discal oblique spots being shorter, and the submarginal dentate lunules broader." (*Moore*, l. c.)

I have not been able to recognise this species with any certainty, though I think it is

* "Near *C. puspa*, Horsfield. MALE. *Forewing* comparatively shorter. UPPERSIDE with the blue less intense and slightly paler, the discal area slightly white-speckled, with a blackish outer marginal band of one-twelfth inch in width. *Hindwing* with a narrow macular marginal band. UNDERSIDE, *both wings* greyish-white. *Forewing* with a slender indistinct dusky-black disco-cellular streak, four transverse discal outwardly-oblique short linear spots, a small costal spot, a submarginal and marginal row of lunular spots. *Hindwing* with three small black subbasal spots, an irregular discal transverse series of nine spots, an indistinct submarginal and marginal row of dentate lunular spots," the usual disco-cellular streak. (*Moore*, l. c.) Mr. Moore has here described the rains form of this species.

probably the dark rains form of *C. jynteana.* From the plate it appears to be a rather larger species than the *C. jynteana* as figured by Mr. Moore, the outer black marginal border about one-third broader, the markings of the underside much the same. Mr. Moore recorded *C. jynteana* from the Khasia and Jyntea Hills, so I think that when he described *C. sikkima* he considered it to be the Sikkim representative of that species, though I have specimens of *C. jynteana* from Sikkim named by Mr. Moore since his description of *C. sikkima* was published.

688. **Cyaniris cœlestina,** Kollar.

Lycæna cœlestina, Kollar, Hügel's Kaschmir, vol. iv, pt. 2, p. 423, n. 10 (1848); *Cyaniris cœlestina,* Moore, Proc. Zool. Soc. Lond., 1882, p. 244; *Lycæna kollari,* Westwood, Gen. Diurn. Lep., vol. ii, p. 491, n. 69 (1852); *Cyaniris kollari,* Butler, Proc. Zool. Soc. Lond., 1886, p. 367, n. 45; idem, id., Ann. and Mag. of Nat. Hist., sixth series, vol. i, p. 148, n. 51 (1888); *Polyommatus kasmira,* Moore, Proc. Zool. Soc. Lond., 1865, p. 503, n. 100, pl. xxxi, fig. 1, *male*; idem, id., l. c., 1874, p. 271, n. 67.

HABITAT: Western Himalayas.

EXPANSE: ♂, 1·00 to 1·35; ♀, 1·05 to 1·35 inches.

DESCRIPTION: "MALE. UPPERSIDE, *both wings* purplish lavender-blue, exterior margins blackish. UNDERSIDE, *both wings* cream-white. *Forewing* with an indistinct disco-cellular streak, beyond which, one-third from the apex, is a single white-encircled black spot; a transverse discal series of four white-encircled black spots; a marginal double row of indistinct blackish lunules. *Hindwing* with twelve basally-disposed, white-encircled, black spots; a marginal row of blackish spots, bordered by a submarginal series of indistinct blackish lunules. FEMALE. UPPERSIDE, *both wings* brighter blue. *Forewing* with the costa and exterior margin, *hindwing* with the anterior margin broadly dull black, the latter with a marginal row of blackish spots, bordered by a submarginal series of lunules. UNDERSIDE, *both wings* as in the male. *Cilia* white." (*Moore,* l. c. in Proc. Zool. Soc. Lond., 1865.)

LARVA when full grown ·6 of an inch in length; of the usual lycænid shape, coloration pale light green, of the exact shade of young leaves; the very small head, placed upon a long neck, is intensely black and shining; the segments increase slightly in width to the fifth, then gradually decrease to the thirteenth, the whole surface is finely shagreened, but entirely without markings, except two dorsal lines of a pale bluish-green colour from the second to the tenth segment, slightly converging posteriorly, the colour of the ground between these lines slightly darker than the rest of the surface; a few colourless short lateral hairs; the segments shallowly constricted; no mouth-like opening on the eleventh or erectile organs on the twelfth segments. Feeds on *Prinsepia utilis,* native name Bhenkal. PUPA ·40 to ·45 of an inch in length; of the usual lycænid shape, pale brown, irregularly and obscurely spotted and blotched with darker brown, no regular markings whatever, the surface rough, with short colourless bristly hairs.

I am indebted to Mr. P. W. Mackinnon for living examples of the larvæ and pupæ of this species collected at Masuri in the Western Himalayas. He informs me after careful watching that ants do not attend the larvæ.

Both Eversmann (1843) and Kollar (1848) described species of blues under the name of *Lycæna cœlestina*; hence considerable confusion has arisen. I think, however, that instead of following Westwood's action in renaming Kollar's species *kollari,* both names may be retained, as Eversmann's species, as far as I can ascertain, is a true *Lycæna,* while Kollar's is a *Cyaniris.* In 1882 Mr. Moore put straight the synonymy of the two species of this group occurring in the Western Himalayas. This Mr. Butler has of late upset. In Proc. Zool. Soc. Lond., 1886, p. 367, he gives *kollari* of Westwood, with *cœlestina,* of Kollar, as a synonym, remarking that "Kollar's name having been already used by Eversmann cannot possibly be admitted." In the Ann. and Mag. of Nat. Hist, 1888, vol. i, p. 148, he revives *kasmira* of Moore, which the latter gentleman said, in 1882, is a synonym of *cœlestina,* Kollar, and gives *kollari* of Westwood without any synonymy as a distinct species. I can recognise two species of this group only, but Butler appears to recognise three, *kasmira, kollari,* and *huegelii.* He notes, however, that the two former may possibly be races, or even alternating generations, of

one species. He also states that *kasmira* is intermediate in size between *huegelii* and *kollari*.

There is no difficulty whatever in recognising *C. cœlestina*. Both sexes are considerably smaller than *C. huegelii*, and the male has the outer black border on the upperside of the forewing broader, and considerably dilated at the apex. It is an extremely common species, occurring throughout the outer ranges of the Western Himalayas, at any rate from Kashmir and Murree to Naini Tal. Mr. Doherty records it from Bagheswar, Kumaon, as low as 3,500 feet, and Garbyan, also in Kumaon, as high as 12,000 feet.

689. Cyaniris dilectus, Moore.

Polyommatus dilectus, Moore, Proc. Zool. Soc. Lond., 1879, p. 139; *Cyaniris dilectus*, de Nicéville, Journ. A. S. B., vol. lii, pt. 2, p. 68, n. 4, pl. i, fig. 5, *male* (1883).

HABITAT: Simla; Kumaon; Nepal; Sikkim; North Cachar; Sibsagar, Upper Assam; Upper Burma.

EXPANSE: ♂, 1·00 to 1·40; ♀, ·85 to 1·35 inches.

DESCRIPTION: "MALE. UPPERSIDE, *both wings* pale blue, with a very fine black anteciliary line, which towards the apex of the forewing in some specimens becomes slightly diffused inwardly. *Forewing* with a patch of irrorated white scales on the disc below the cell and between the median nervules, very prominent in some specimens, obsolete in others (as in the Sikkim specimen figured). *Hindwing* with a similar patch, but placed between the second median nervule and the costal nervure, and almost reaching the apex. UNDERSIDE, *both wings* as in *C. albocæruleus*, Moore, but with a more or less prominent submarginal series of dusky lunules. FEMALE. UPPERSIDE, *forewing* almost as in *C. albocæruleus*, but the outer margin less broadly black, the basal area glossed with very bright metallic blue, not unmetallic pale lavender-blue as in the latter species, the disco-cellular streak more prominent. *Hindwing* with the submarginal series of round dusky prominent spots inwardly defined by bluish lunules. UNDERSIDE, *both wings* as in the male."

"Both sexes of this species were taken by me in the neighbourhood of Simla, most frequently on Tawa Devi, also at different elevations in Sikkim in October. Mr. Otto Möller has also taken males in large numbers in Sikkim at low elevations in the spring." (*de Nicéville*, l. c.)

In Sikkim this species is slightly dimorphic. The rains form has barely a trace, sometimes none whatever, of the discal white patch, which in the dry-season form is very prominent on the upperside of the forewing. On the hindwing this patch is also much larger in the dry-season form. The markings of the underside of both wings are also more prominent in the rains form. This species is one of the most distinct in the genus and very easily recognised. I have, however, entirely failed to distinguish its female from Sikkim, though I am sure that the Simla females above described are correctly identified. In Simla but few species of the genus occur, so it is comparatively easy to pair the sexes; this is not the case in Sikkim. Mr. Doherty records it from Khati, N.-W. Kumaon, 7,000 feet, Toli and Garjiaghat, E. Kumaon, 2000 to 3000 feet, scarce. His specimens were very small. I append Mr. Moore's original description of it as a foot note.*

690. Cyaniris huegelii, Moore.

C. huegelii, Moore, Proc. Zool. Soc. Lond., 1882, p 244; *Lycæna argiolus*, Kollar (*nec* Linnæus), Hügel's Kaschmir, vol. iv, pt. 2, p. 423, n. 11 (1848).

HABITAT: Western Himalayas.

EXPANSE: ♂, ♀, 1·42 to 1·70 inches.

DESCRIPTION: "Differs from *C. cœlestina*, Kollar, in its larger size. MALE. UPPERSIDE, *both wings* similar in colour, but of a darker blue tint. *Forewing* with a more slender blackish

* "MALE. UPPERSIDE, *both wings* pale lilac-blue, with a very slender marginal black line; discal area of *forewing* and apical area of *hindwing* slightly whitish. *Cilia* white. UNDERSIDE, *both wings* white, with small slender indistinct blackish markings disposed as in *P.* [=*C.*] *puspa*, Horsfield. FEMALE similar to *P.* [=*C.*] *puspa*. UPPERSIDE, *both wings* paler, the exterior dusky-brown band on the *forewing* of less breadth, and the blue extending to posterior margin. *Hindwing* bluer, less dusky anteriorly, with a marginal row of indistinct dusky spots." (*Moore*, l. c.)

marginal band. *Hindwing* with a clearly-defined marginal line. UNDERSIDE, *both wings* with similar but more distinct markings than in *C. cœlestina*, the discal series of spots on the *hindwing* more linear in shape, the marginal spots and submarginal lunular band much more prominent. FEMALE more dusky throughout than in *C. cœlestina*. UPPERSIDE, *forewing* with broader blackish marginal borders and disco-cellular lunule. *Hindwing* with the blackish costal border and marginal spots broader, the latter with well-defined inner pale dentate marks, the inner area beyond and the veins also dusky black." UNDERSIDE, *both wings* as in the male.

"This species has hitherto been considered to be Kollar's *L. cœlestina*; but both his description and measurements undoubtedly agree with *C. kasmira*." (*Moore*, l. c.)

This species has exactly the same range as *C. cœlestina*, Kollar, and is equally common. Mr. Doherty records it from all Kumaon, from as low at 3,500 feet at Bagheswar, and as high as 12,000 feet at Garbyan. It may at once be known by its large size, and the marginal black border of the forewing of the male on the upperside being very narrow throughout.

691. **Cyaniris singalensis**, Felder.

Lycæna singalensis, Felder, Verh. zool.-bot. Gesellsch. Wien, vol. xviii, p. 282 (1868); *Polyommatus singalensis*, Moore, Ann. and Mag. of Nat. Hist., fourth series, vol. xx, p. 342 (1877); *Cyaniris singalensis*, id., Lep. Cey., vol. i, p. 76, pl. xxxv, figs. 1, 1*a*, *male* (1881).

HABITAT: Nilgiris, Ceylon.

EXPANSE: ♂, 1·2 to 1·5; ♀, 1·2 inches.

DESCRIPTION: "A geographical form of *L.* [= *C.*] *argiolus*, Linnæus. Nearest to *L. kollari*, Westwood, from the Himalayas, but UPPERSIDE with the streak before the cilia blackish-fuscous. UNDERSIDE with the border spots nearer to the margin. *Forewing* with the external virgulæ broader. *Hindwing* with the dots larger." (*Felder*, l. c.)

"MALE. UPPERSIDE, *both wings* light blue; *cilia* white, with blackish inner border. UNDERSIDE, *both wings* white. *Forewing* with a dusky brown streak at the end of the cell, a submarginal series of five slightly-recurved dentate spots, a spot near the costa, and a marginal row of small spots enclosed by an inner row of dentate lunules. *Hindwing* with three subbasal spots, a spot on the costa beyond the middle, a spot within and a streak at the end of the cell, a curved discal series of five irregular-shaped spots, a curved streak above the anal angle, and marginal row of small spots enclosed by dentate lunules. *Tibiæ* and *tarsi* black-streaked above."

"Near to *P. kasmira*" [= *C. cœlestina*, Kollar]. (*Moore*, l. c. in Ann. and Mag. of Nat. Hist.)

"FEMALE. UPPERSIDE, *both wings* with the anterior and exterior borders pale brown. *Hindwing* with a row of pale blue sinuous marks on the border." Otherwise as in the male. (*Moore*, l. c. in Lep. Cey.)

Felder describes this species with reference to *L. kollari*, = *C. cœlestina*; it is really nearer to *C. huegelii*, Moore, as the black border to the forewing on the upperside in the male does not expand towards the apex as in that species. It may readily be known from *C. huegelii*, however, in both sexes by the submarginal series of lunules on the underside of the forewing being of equal size throughout and not prominent, while in *C. huegelii* the three posterior of these lunules rapidly increase in size, often almost forming quadrate spots, and are very conspicuous. It may be known from *C. lanka*, Moore, the only other species of the group occurring in Ceylon, by the much lighter shade of blue of the upperside in the male and by the markings of the underside, which also are quite different. It appears to be a much rarer species in Ceylon than *C. lanka*, and according to Wade occurs at Kandy. The type specimen was from Kallupahane. Messrs. Mackwood and Fairlie have sent me specimens ticketed Masdeliya, Dimbula, and Naturata. I possess nine male specimens of a *Cyaniris* from the Nilgiri Hills sent me by Mr. G. F. Hampson as *C. limbatus*, Moore, but as they are "light blue" on the upperside instead of "lilac-blue," which latter colour I take to be darker than light blue, I place them with *C. singalensis*, rather than with *C. limbatus*. As far as I can see, this difference

in the shade of the blue on the upperside of the male is the chief character by which the two species can be distinguished, though the spots on the underside of the forewing are rather more irregularly placed in *C. limbatus* than they are in *C. singalensis.*

692. **Cyaniris lanka,** Moore.

Polyommatus lanka, Moore, Ann. and Mag. of Nat. Hist., fourth series, vol. xx, p. 342 (1877); *Cyaniri lanka*, id., Lep. Cey., vol. i, p. 76, pl. xxxv, figs. 2, *2a, male* (1881).

HABITAT: Ceylon.

EXPANSE: ♂, 1·3 to 1·5; ♀, 1·2 inches.

DESCRIPTION: "MALE. UPPERSIDE, *both wings* very dark blue. *Cilia* white, with blackish inner marginal border. UNDERSIDE, *both wings* white. *Forewing* with a dusky brown streak at the end of the cell, a submarginal transverse linear row of four [or five] linear spots, a spot near the costa, and a marginal row of dentate spots. *Hindwing* with two equi-distant brown spots on the anterior border, a spot within and a streak at the end of the cell, a curved discal series of five spots, two lunate marks on the abdominal border, and an outer marginal row of dentate spots. *Tibiæ* and *tarsi* with black bands."

"Near to *P. kasmira*" [=*C. cœlestina*, Kollar]. (*Moore*, l. c. in Ann. and Mag. of Nat. Hist.)

FEMALE. UPPERSIDE, *forewing* glossy bluish-purple, outwardly paler; the costa somewhat broadly, the outer border more broadly and decreasingly black. *Hindwing* rather paler than in the forewing, the costa bounded posteriorly by the costal nervure and its second branch black, a series of oval black spots between the veins on the margin, the veins outwardly black, an anteciliary black line. *Cilia* whitish. UNDERSIDE, *both wings* as in the male.

The nearest ally to this species is *C. limbatus*, Moore, especially specimens of that species from Shillong. It may, however, be known by its very dark lavender-blue colour on the upperside of the male, and by the discal spots on the underside of the forewing in both sexes being arranged almost in a line and divided only by the veins; in every other Indian species they are arranged more or less angle to angle. It appears to be the commonest species of the genus in Ceylon. Mr. Hutchison records it from the "Central Province; hills, 3,000 to 6,000 feet, in forest land, at all times. Gregarious. Settles by hundreds in damp spots on the roads." Wade records it from Kandy, and Messrs. Mackwood and Fairlie have sent me specimens from Lindula, Punduloya, East Matall, Masdeliya, Lagella, and Kakgalla.

693. **Cyaniris limbatus,** Moore.

Polyommatus limbatus, Moore, Proc. Zool. Soc. Lond., 1879, p. 139.

HABITAT: Khasi Hills; Parisnath Hill, Behar, Bengal; Nilgiris; Travancore; Ceylon.

EXPANSE: ♂, 1·1 to 1·5; ♀, 1·4 inches.

DESCRIPTION: "MALE. UPPERSIDE, *both wings* lilac-blue. *Cilia* white, with an inner black line. *Forewing* with a very narrow exterior marginal black band. *Hindwing* with a very narrow marginal black line and a few minute speckles at apex. UNDERSIDE, *both wings* white, with slender dusky markings, as in *P.* [=*C.*] *puspa*, Horsfield."

"Differs from *P.* [=*C.*] *dilectus*, Moore, in its more pointed forewing, darker colour, and more prominent marginal line." (*Moore*, l. c.)

FEMALE. UPPERSIDE, *forewing* with the costa, apex and outer margin broadly black, the rest of the wing iridescent bluish-purple, paler outwardly; a somewhat indistinct discocellular spot. *Hindwing* blue, the veins, costa and outer margin broadly black, the latter bearing series of blue well-formed lunules. UNDERSIDE, *both wings* as in the male. Described from a specimen from Shillong.

There is no difficulty whatever in distinguishing this species from *C. dilectus*, the latter being of a much lighter blue colour on the upperside, and almost always having irrorated patches of white on both wings. It is very much nearer to *C. lanka*, Moore, the latter, however, in the male being still darker on the upperside, the narrow black border still narrower, and the discal series of spots on the underside of the forewing arranged almost in a connected line, not well-separated and irregularly-placed as in *C. limbatus.* It differs from *C. singalensis,*

Felder, only in the colour of the upperside in the male being of a deeper shade ; the markings of the underside in that species are perhaps placed rather more in echelon. Specimens from Shillong, Assam, are rather larger than those from the Nilgiris, and the spots on the underside are a trifle more prominent, but they do not otherwise differ. I possess twenty-two specimens of this species from Ceylon, whence it has not previously been recorded.

Dr. Felder described the genus *Lycænopsis*, placing in it his *ananga*, which is a synonym of *haraldus*, Fabricius. Mr. Distant suppresses the genus *Lycænopsis*, stating that he "can find no sufficient character to separate" it "from *Cyaniris*. Felder himself appended to his diagnosis of the typical species the remark 'In the pattern of the underside reminds one also of the group of *Lycæna* [= *Cyaniris*] *argiolus*, Linnæus,' and as Mr. Moore gives this species as the type of *Cyaniris*, there seems little doubt as to common identity." Mr. Distant may be right in suppressing this genus, but, judging from the figure of the male of the type species, I should not be surprised to find that it is structurally distinct from the species of the genus *Cyaniris* ; unfortunately I have no specimen to examine. It is much larger than most species of *Cyaniris* ; the upperside of the male has the outer half (nearly) of the forewing black, the rest of the wing bright cærulean-blue, the apex and outer margin of the hindwing only black, and the rest blue. The underside is much more remarkable, and differs from every species of known *Cyaniris* in having marginal markings only on both wings, the disc and base being immaculate. According to Mr. Distant the female in equally remarkable. I append Mr Distant's description of *C. haraldus*,* and Dr. Felder's definition of the genus *Lycænopsis*. †

Genus 111.—ZIZERA, Moore. (PLATE XXVI).

Zizera, Moore, Lep. Cey., vol. i, p. 78 (1881) ; id., Distant, Rhop. Malay., p. 212 (1884).

"FOREWING, small, elongated, triangular ; *costal nervure* extending to half length of the wing, *first subcostal nervule* emitted at one-half length before the end of the cell, and slightly touching the costal nervure near its end, *second* subcostal at one-third, *third* subcostal at one-sixth, *fourth* subcostal from half of third and terminating before the apex, *fifth* subcostal from the end of the cell ; *discoidal cell* long, broadest in the middle ; *middle* and *lower disco-cellular nervules* slightly oblique in the middle ; *lower discoidal* nervule from the middle ; *second median* nervule emitted at one-sixth, *first* median at one-half before the end of the cell ; *submedian nervure* slightly recurved. HINDWING, small, short, oval ; *costal nervure*

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* *Cyaniris haraldus*. *Papilio haraldus*, Fabricius, Mant. Ins., vol. ii, p. 82, n. 744 (1787) ; *Hesperia haraldus*, id., Ent. Syst., vol. iii, pt. 1, p. 317, n. 201 (1793) ; *Danis haraldus*, Butler, Cat. Fab. Lep. B. M., p. 161, n. 1 (1869) ; *Lycænopsis haraldus*, id., Trans. Linn. Soc. Lond., Zoology, second series, vol. i, p. 546, n. 1 (1877) ; *Cyaniris haraldus*, Distant, Rhop. Malay., p. 211, n. 2, pl. xxi, fig. 6, *male* (1884) ; *Polyommatus heraldus*, Godart, Enc. Méth., vol. ix, p. 677, n. 188 (1823) ; *Lycænopsis ananga*, Felder, Reise Novara, Lep., vol. ii, p. 257, n. 303, pl. xxxii, figs. 10, 11, *male* (1865). HABITAT : Malacca, Sumatra. EXPANSE : *Male* and *female*, 1·25 to 1·60 inches. DESCRIPTION. "MALE. UPPERSIDE, *both wings* bright cærulean blue. *Forewing* with the costal margin narrowly and the apex and outer margin broadly blackish. *Hindwing* with the costal area beyond the base creamy-white, the posterior margin blackish, and the abdominal margin creamy-white. UNDERSIDE, *both wings* creamy-white. *Forewing* with the following blackish markings :—costal margin narrowly, and an outer series of somewhat cruciform spots placed between the nervules, bounded on each side by a marginal and submarginal line, the last preceded by a disjointed series of linear streaks. *Hindwing* similarly marked as the forewing, but with the series of spots larger and not cruciform. FEMALE. UPPERSIDE, *both wings* blackish, with a broad white fascia crossing the disc, commencing near the third median nervule of the forewing, and continued across the hindwing to about the middle of the abdominal margin. UNDERSIDE, *both wings* as in the male."

"This species varies greatly in size, and the female is on the upperside of a most distinct and divergent character, closely resembling the general markings found in the genus *Castalius*, Hübner. The female also appears to be at least difficult of capture, as it is rare in collections, and although I possess a specimen (unlocalised) I have never received it from the Malay Peninsula.' (*Distant*, l. c.)

† Genus *Lycænopsis*, Felder, Reise Novara, Lep., vol. ii, p. 257 (1865). "*Eyes* tolerably large, naked. *Palpi* adpressed-squamose, smooth, directed upwards, with the second joint (in the male) subincrassate, not reaching the forehead, with the terminal joint scarcely extending beyond the fourth part of the second, but strong, somewhat nodding, formed as in some *Lycænæ*. *Antennæ* slender, hardly [or little] extending beyond the middle of the costa, annulated with white below, the club suboval, rather short, excavated below. WINGS very entire, with the veins as in *Hypochrysops*, Felder, but with the median vein closer, with its first branch more distant from the second in the HINDWING."

"The veins and antennæ shew some resemblance to several groups of *Lycæna*, while the structure of the head and palpi shew still nearer connection with *Hypochrysops*, from which genus, however, it may easily be distinguished, chiefly by its shorter and differently clubbed antennæ." (*Felder*, l. c.)

arched at the base, extending to the apex; *first subcostal nervule* at one-fourth before the end of the cell; *upper disco-cellular* nervule shorter, [outwardly] oblique, *lower* disco-cellular erect; *discoidal* nervule from their middle; *discoidal cell* short, broad; *third* and *second median nervules* from the end of the cell; *submedian nervure* straight; *internal* nervure recurved at base; no tail. BODY, slender, *abdomen* long; *palpi* very long, porrect, second joint projecting more than half its length beyond the front of the head, laxly pilose beneath, third joint long, slender, half the length of the second, naked; *legs* slender; *antennæ* with a stout broad spatular club. Type, *Z. alsus*," Wiener Verzeichniss, the "Bedford Blue" of England. (*Moore*, l. c.)

I should describe the veins of the forewing as follows: First subcostal nervule strongly bowed upwards a little beyond its origin and touching the costal nervure, the latter at the point of junction is slightly bowed downwards, second subcostal given off midway between the bases of the first subcostal and upper disco-cellular, third subcostal given off at less than half the distance between the apex of the cell and of the wing, reaching the costa long before the apex of the wing, subcostal nervure terminating at the apex; middle disco-cellular nervule slightly outwardly oblique, concave; lower disco-cellular as long as the middle, concave, slightly inwardly oblique.

LARVA green, onisciform, the upper portion of the body finely shagreened or covered with short tubercles emitting colourless hairs, no prominent markings. PUPA, pale green, of the usual lycænid shape, finely hairy.

The genus *Zizera* hardly differs in venation from the genera *Lycæna*, *Chilades*, and *Cyaniris* which immediately precede it, but I find that in *Zizera* the second median nervule of the hindwing is given off at instead of before the lower end of the cell, as in those genera. The species of the genus have, however, a very distinct *facies* of their own. Some of them are the smallest known species of butterflies. Mr. Trimen states that he has a specimen of his "*Lycæna barberæ*," taken at Robertson in South Africa, which expands only five lines, or less than half an inch. In India the smallest butterfly I have seen is a specimen of *Z. gaika*, Trimen, which is only ·6 of an inch in expanse. The genus is widely distributed, occurring almost throughout Europe, in North and South Africa, and throughout Asia, and probably in other regions, but its exact distribution cannot be stated, as so very few entomologists use this name for this group of butterflies, usually calling them *Lycæna*. In India the genus occurs almost everywhere: in the Himalayas one species has been recorded from an altitude of 9,000 feet, but it is in the plains that it seems to flourish best, two out of the four species admitted by me as distinct actually swarming at times. Wherever there is a little low vegetation, there almost certainly will one species or another, often more than one, be found; even in such desert regions as the neighbourhood of Aden and Karachi they appear to flourish exceedingly and to be very numerous in individuals. In India I can recognise but four species, though modern authors have recorded fully a dozen. If my readers will carefully study (as I have done) the wide distribution of these species, and note how continually the same locality is given for the parent species and its variety or varieties in each case, and also bear in mind the great effect the wet and dry-seasons have on these butterflies, I think that they can but arrive at the same conclusion as I have done. The largest species is *Z. maha*, Kollar, the male of which can at once be distinguished by its silvery blue colour on the upperside, with a more or less broad outer black border; the female is very variable, some specimens being entirely black above, others nearly as blue as the darkest-marked males. The other three species are all lilac-blue on the upperside of the male, the females more or less black, with sometimes a good deal, sometimes very little, of blue towards the base of the wings. *Z. lysimon*, Hübner, agrees with *Z. maha* in the markings of the underside, having a spot near the middle of the discoidal cell of the forewing, which spot is absent in the other two species. *Z. gaika*, Trimen, is easily distinguished by having a spot on the costa of the forewing on the underside internal to the spot at the end of the discoidal cell which is not present in either of the other species; and *Z. otis*, Fabricius, agrees with *Z. gaika* in having no spot

in the middle of the cell of the forewing, but differs from it in lacking the two spots (one on either side of the spot closing the discoidal cell) on the costa. As mentioned above, much uncertainty exists as to the extent of the species of this genus, and as my opinion will probably be called in question, I shall in the following pages give the original descriptions as far as possible of all the species described from India, and in the habitat headings and in the key to the species give only the localities for each that have been recorded by others. Climate, as has already been said, has a great effect on these butterflies, but as these occur everywhere in India, and the different climatic belts are not sharply defined, I cannot even divide them, as I otherwise should attempt to do, into local races. Seasonal variation too is very marked in *Z. maha*, the specimens which occur in the rains being very much darker than those which are about in the dry-season. The markings of the underside of all the species vary considerably according to the season at which they emerge from the pupa, this being especially remarkable in *Z. maha* and *Z. otis*; in these the markings are almost entirely obliterated in the cold dry-weather forms. All the Indian species of *Zizera* are weak-flying butterflies, which abound where grass, coarse herbage, and weeds grow; they seldom rise much above the ground, and never settle on high bushes and trees, as so many *Lycænidæ* do.

Key to the Indian species of Zizera.

A. Spot in cell of forewing on underside internal to disco-cellular spot.
- *a.* Of large size, male above silvery-blue.
  - 694. Z. MAHA, Western Himalayas, plains of N.-W. India, Central India.
  - 695. Z. CHANDALA, Kashmir, Western Himalayas, N.-W. and Central India.
  - 696. Z. DILUTA, Bengal, Western Himalayas, Punjab, Cachar.
  - 697. Z. SQUALIDA, Cachar, North-West India.
  - 698. Z. OSSA, Bombay, Deccan.
- *b.* Of small size, male above violet-blue.
  - 699. Z. LYSIMON, South Europe, Africa, Asia, parts of Australasia.
  - 700. Z. KARSANDRA, Arabia, throughout India, Burma, Ceylon, and the Nicobars.
  - 701. Z. MORA, Karachi.

B. No spot in cell of forewing on underside internal to disco-cellular spot.
- *a.* Two spots on costa of forewing on underside, one on either side of disco-cellular spot.
  - 702. Z. GAIKA, South Africa, Arabia, India, Ceylon, Malayana.
- *b.* No spots whatever on costa of forewing on underside.
  - 703. Z. OTIS, Burma, Malay Peninsula, Java, Sumatra, N. Celebes, China.
  - 704. Z. SANGRA, India, Andaman and Nicobar Isles, Burma, Formosa.
  - 705. Z. INDICA, N.-W. Provinces, Central India, Deccan, N.-W. Himalayas, Ceylon, Formosa.
  - 706. Z. DECRETA, Mhow.

694. Zizera maha, Kollar. (PLATE XXVI, FIG. 172 ♂).

Lycæna maha, Kollar, Hügel's Kaschmir, vol. iv, pt. 2, p. 422, n. 9 (1848); *Zizera maha*, Moore, Proc. Zool. Soc. Lond., 1882, p. 245; id., Swinhoe, l. c., 1886, p. 426, n. 42; id., Doherty, Journ. A. S. B., vol. lv, pt. 2, p. 133, n. 177 (1886); id., Butler, Ann. and Mag. of Nat. Hist., sixth series, vol. i, p. 148, n. 52 (1888).

HABITAT: Masuri (*Kollar*); Kangra district, N.-W. Himalayas (*Moore*); Mhow, April, May, and June; Manpore, June (*Swinhoe*); Kumaon generally from the plains up to 9,000 feet (*Doherty*); Campbellpore, 17th April; Hassan Abdal, 9th May, 1886 (*Butler*).

EXPANSE: ♂, ♀, ·95 to 1·30 inches.

DESCRIPTION: "MALE. UPPERSIDE, *both wings* silvery-bluish, with the entire border fuscous. UNDERSIDE, *both wings* cinereous, with a series of black dots larger in the forewing, smaller in the hindwing, all the dots circled with whitish. FEMALE. UPPERSIDE, *both wings* fuscous, mingled with bluish." (*Kollar*, l. c.)

Mr. Butler notes: *Z. maha* "is easy to recognize, the male above being of a pale silvery lilac or azure tint, changing in certain positions to grey and silvery white; the extreme outer margin black, the forewing with a dusky submarginal stripe; the female is steel-blue above, with the costal borders and the outer border of the forewing broadly black; the hindwing usually with a broad whitish outer border, on which are some black marginal spots; the pattern below corresponds nearly with that of *Z. diluta*, Felder, excepting that the hindwing is

browner, and the markings on that wing are smaller and less distinct. We [the British Museum] have two dozen specimens in our collection, varying only in the tint of the upperside in the males, which in some examples is silvery blue, in other silvery lilac."

The type specimens of this species are said by Kollar to have been obtained at Masuri in the Western Himalayas. At Simla, which is about 70 miles as the crow flies from Masuri, I know this species well in life. It presents two distinct seasonal forms. In the one which occurs in the dry-season, the male on the upperside of the forewing has an anteciliary fine black line and traces of a submarginal dusky fascia; the female has the basal two-thirds of the forewing on the upperside blue, the outer third black; the markings of the underside not prominent. This form is the *ossa* of Swinhoe. The wet-season form in Simla has the black anteciliary line and the submarginal fascia on the upperside of the forewing in the male conjoined, giving a somewhat broad outer dark margin; the female is black on the upperside, sometimes with a few scattered blue scales on the basal area; the markings of the underside are prominent. This form is the *chandala* of Moore. It is difficult to say from the description by Kollar to which form his *maha* applies. In Sikkim *Z. maha,* Kollar, is a most variable species. The palest form of the male has the upperside pale silvery blue, with a very narrow outer black margin; the next darkest form bears an indistinct submarginal black fascia on the forewing; the next darkest has this fascia joined to the outer black margin; the darkest of all has the outer third of the forewing and all but the disc and base of the hindwing black. The females are even more variable; the palest being less dark that the darkest male in the forewing, the hindwing with a marginal series of black spots; the next darkest has the disc and base only of the forewing blue, the hindwing throughout thickly powdered with black scales; the next darkest has the base of the forewing alone shot with blue; the darkest form of all has the upperside entirely black. The pale forms occur in the dry-season, the dark ones in the rains. The colour of the ground on the underside varies from pale whity-brown to darkish brown, and there is much diversity also in the prominence of all the spots. In Sikkim, it occurs almost throughout the year. In Calcutta, where I know *Z. maha* equally well, the same seasonal dimorphism occurs, and, from the large series of specimens I possess from all parts of India, I find that this phenomenon occurs wherever the two seasons, wet and dry, are strongly marked.

Taken in the broad sense in which I view it, *Z. maha* occurs almost throughout India, but neither in Ceylon, the Andamans and Nicobars, nor in Burma. Its range is apparently bounded on the west by the Indus, Major Yerbury having obtained it at Campbellpore; in the Himalayas it occurs on the outer ranges only; to the east it extends to Assam; and is found throughout peninsular and continental India. There is very little doubt in my mind that the "*Lycæna*" *argia* of Ménétriés (of which *Z. japonica,* Murray, and *Z. alope,* Fenton, are synonyms), which occurs in China, Japan, and Corea* should be added to the synonymy of this species. Mr. Leech collected over 200 specimens in every locality he visited in those countries, and found the species quite as variable there as it is in India, indeed even more so, as he says that the spot in the discoidal cell of the forewing on the underside is sometimes absent, a feature I have not observed in Indian examples. I am not aware of any form of *Z. maha* occurring in Central Asia, but it is probable that it is found there. I give in full below the descriptions and localities of *Z. chandala, Z. diluta, Z. squalida,* and *Z. ossa,* and the remarks on them recorded by different authors who have studied these species.

LARVA when full-grown about ·4 of an inch in length, green, onisciform, with a dorsal line of a darker green than the ground, the entire upper surface finely shagreened, the minute whitish tubercles giving out very fine short colourless hairs. No distinctive markings whatever. Head smooth, black, shining, as usual. Feeds in Calcutta on *Oxalis corniculata,* Linnæus. PUPA very pale green, attached to the underside of the leaves of the food-plant; finely hairy, without markings, of the usual lycænid shape.

The figure shews both sides of a male specimen from Simla in the collection of the Indian Museum, Calcutta.

* J. H. Leech, Proc. Zool. Soc. Lond., 1887, p. 415, n. 56.

695. **Zizera chandala**, Moore.

Polyommatus chandala, Moore, Proc. Zool. Soc. Lond., 1865, p. 504, n. 104, pl. xxxi, fig. 5 *male**; idem, id., l. c, 1874, p. 272, n. 68; *Zizera chandala*, Swinhoe, l. c., 1886, p. 426, n. 43.

HABITAT: Lower Himalayas, and plains of N.-W. India; Kashmir (*Moore*); Oudh, Punjab, Lower Himalayas (*Lang*); Mhow, November, February, April, and May (*Swinhoe*).

EXPANSE: ♂, 1·0 inch.

DESCRIPTION: "MALE. UPPERSIDE, *both wings* dull silvery-blue, with purplish-brown exterior margins. UNDERSIDE, *both wings* pale grey. *Forewing* with a spot within the discoidal cell, a disco-cellular streak, a transverse discal linear series of six [sometimes seven] clear-white-encircled black spots, between which and exterior margin is a series of indistinct pale-bordered lunules. *Hindwing* with basal and discal series of pale brown, whitish-encircled spots, and a marginal row of indistinct pale-bordered lunules. *Cilia* purplish-brown." (*Moore*, l. c. in Proc. Zool. Soc. Lond., 1865.)

"This is a generally-distributed species, affecting both the plains and the lower Himalayan valleys, occasionally ascending the mountain slopes to 6,000 feet altitude. I have taken it in the later autumn months in Oudh, the Punjab, and lower Himalayas." (*Note by Colonel A. M. Lang, R.E.*)

"Mr. Moore, in Proc. Zool. Soc. Lond., 1882, p. 245, has put this species as a synonym of *Z. maha*, Kollar. This I think is a mistake. He had, if I recollect rightly, only two examples, both males, in his collection. They were quite common at Mhow; and I found no difficulty in recognizing them; they are much paler blue than *Z. maha*. The females are the same colour as the males, instead of brown like *Z. maha*, and the underside in both sexes has very faint spots on the hindwing, each spot having a whitish ring round it." (*Swinhoe*, l. c.)

I am of opinion that Mr. Moore was quite right in 1882 in sinking his *Z. chandala* under *maha*; Mr. Butler in 1888 also sinks *chandala* under *maha*. It is almost impossible for any one now to say exactly what form Kollar described as *maha*; not that this matters, as I have shown how infinitely variable this species is. Mr. Elwes very justly remarks† that he is "quite unable to say what are the limits and distinctive characters of these various species [*i.e.*, *maha*, *chandala*, and *diluta*], if they are distinct."

696. **Zizera diluta**, Felder.

Lycæna diluta, Felder, Reise Novara, Lep., vol. ii, p. 280, n. 353, pl. xxxv, figs. 12, 13, *male* (1865); *Zizera diluta*, Rothney, Ent. Month. Mag., vol. xix, p. 35 (1882); id., de Nicéville, Journ. A. S. B., vol. liv, pt. 2, p. 46, n. 63 (1885); id., Butler, Proc. Zool. Soc. Lond., 1886, p. 367, n. 46; idem, id., Ann. and Mag. of Nat. Hist., sixth series, vol. i, p. 149, n. 54 (1888); id., Wood-Mason and de Nicéville, Journ. A. S. B., vol. lv, pt. 2, p. 365, n 113 (1886).

HABITAT: Bengal (*Felder*); Barrackpore (*Rothney*); Calcutta (*de Nicéville*); Campbellpore, June, July, October; Murree, August, September; Akhor, 22nd April; Campbellpore, 4th and 5th May; Hassan Abdal, 27th June, 18th July; Thundiani, 21st and 29th August; Nandar, 25th September, 1886 (*Butler*); Silcuri, Cachar (*Wood-Mason* and *de Nicéville*).

EXPANSE: ♂, 1·1 inches (*from Felder's figures*).

DESCRIPTION: "MALE. UPPERSIDE, *both wings* dilute glaucous, with the base and the disc glittering cyaneous blue, with a fuscous streak before the cilia. *Forewing* with the external border powdered with fuscous. *Hindwing* with the anterior margin powdered with fuscous and with fuscous dot-shaped spots before the margin. UNDERSIDE, *both wings* most pale hoary-brownish, with submarginal spots arranged in a series, angulate in the forewing, lunulate in the hindwing, and others annular marginal inserted of that colour, and a fuscous disco-cellular litura, diffusely bordered with whitish. *Forewing* with a pair of obsolete subcostal spots, a pair subbasal and others exterior in a fascia blackish bordered with whitish. *Hindwing* powdered with greyish at the base, with four small basal spots and others beyond

* The figure of the upperside of this species is very poor; instead of being silvery-blue it is purplish-blue, a totally different shade of colour.

† Proc. Zool. Soc. Lond., 1881, p. 888.

the middle in a bent fascia fuscous margined with whitish. FEMALE. UPPERSIDE darker, with an obsolete disco-cellular litura and the external border inwardly diffuse fuscous. UNDERSIDE as in the male, but all the spots barely blackish." (*Felder*, l. c.)

"In spite of Felder's very poor figure of the upperside, I have never seen any other than this species that could be identified with *Z. diluta*; it has hardly a feature in common with *Z. maha*, which is much nearer to *Z chandala*." (*Butler*, l. c. in Proc. Zool. Soc. Lond.)

Most probably the type specimens of this species were collected by the late Dr. F. Stoliezka in Calcutta. Placing then Calcutta specimens of *Z. diluta* by the side of Simla specimens of *Z. maha*, I cannot imagine how Mr. Butler could have written that the two species have "hardly a feature in common." Specimens of the dry-season form of both (Simla 9th November, Calcutta 8th January) are identical; were the tickets removed I do not think any one could sort them into the two localities. It is more than probable that Dr. Felder did not recognise *Z. maha* when he described *Z. diluta*, nor is he likely to have known of *Z. chandala*, which was described in the same year as his species. Mr. Butler describes a variety from Hassan Abdal, 9th May, Thundiani, 29th August, 1886, both in North-West India, a "Underside, both wings greyer; black spots with narrower white margins." (l. c. in Ann. and Mag. of Nat. Hist.)

697. **Zizera squalida**, Butler.

Lycæna squalida, Butler, Trans. Ent. Soc. Lond., 1879, p. 4; *Zizera squalida*, id., Ann. and Mag. of Nat. Hist., sixth series, vol. i, p. 148, n. 53 (1888).

HABITAT: Cachar; Campbellpore, 21st June; Hassan Abdal, 18th July, 1886. (*Butler*)

EXPANSE: ♀, 1·0 inch.

DESCRIPTION: "MALE. UPPERSIDE, *both wings* vary in colour from silver-grey with a lilac gloss to smoky-grey with a faint bluish gloss. *Forewing* with a blackish external border, considerably narrower than in *Z. diluta*, Felder, and more sharply defined internally. *Hindwing*, costal half brownish; a marginal series of blackish spots. UNDERSIDE, *both wings* scarcely differ from those of *Z. maha*, Kollar, excepting that the discal series of black spots on *forewing* forms a more or less pronounced angle below the second median nervule." (*Butler*, l. c. in Ann. and Mag. of Nat. Hist.) FEMALE. "Allied to *L.* [=*Z.*] *karsandra*, Moore, much larger. UPPERSIDE, *both wings* greyish-brown. *Forewing* sprinkled with lilac scales towards the base. *Body* blackish. *Antennæ* with white annulations. UNDERSIDE, *both wings* sordid white, with black spots, bordered with pure white, arranged as in *L. karsandra* and allies, but the discal series of the *forewing* less arched and smaller; a submarginal series of stone-grey spots, and in front of them a series of lunules of the same colour." (*Butler*, l. c. in Trans. Ent. Soc. Lond.)

Mr. Butler has recently recorded this species from North-West India, and states that the type specimen from Cachar was a female. He now says that "this form is intermediate in character between *Z. maha* and *Z. diluta*, excepting in the angulation of the discal series of spots on the underside; it may possibly be a hybrid. We possess six examples." If these six examples are all exactly alike, it is very unlikely that they are all hybrids, as I believe that in nature hybrids are extremely rare. *Z. squalida* was first described with reference to *Z. karsandra*, which belongs to quite a different group from *Z. maha* and *Z. diluta*, to which Mr. Butler now compares it.

698. **Zizera ossa**, Swinhoe.

Z. ossa, Swinhoe, Proc. Zool. Soc. Lond., 1885, p. 132, n. 57, pl. ix, figs. 11, *male*; 12, *female*.

HABITAT: Poona, September to June; Bombay, September to October. (*Swinhoe*)

EXPANSE: ♂, ♀, 1·1 inches.

DESCRIPTION: "UPPERSIDE, *both wings* pale bluish-grey, costa and outer border black; the breadth of the outer border of the forewing differs a little in the male, but is much wider in the female, is diffused inwardly, and often occupies nearly half the wing. UNDERSIDE, *both wings* pale brownish-grey, with the markings as in *Zizera maha*, Kollar, and *Z. diluta*, Felder."

"A very distinct and pretty little species ; in great plenty in Bombay during September" (*Swinhoe*, l. c.) "Common at all elevations in the Nilgiris." (*G. F. Hampson*).

In the above description Colonel Swinhoe does not say how his species differs from *Z. maha* and *Z. diluta*. To identify such closely-allied species, a comparative description is necessary. It is evidently, however, the dry-season form of *Z. maha*, Kollar.

699. **Zizera lysimon**, Hübner. (PLATE XXVI, FIG. 173 ♀).

Papilio lysimon, Hübner, Eur. Schmett., vol. i, pl. cv, figs. 534, 535, *male* (1798-1803) ; id., Ochsenheimer, Schmett. Eur., vol. i, pt. 2, p. 24 (1808) ; *Polyommatus lysimon*, Godart, Enc. Méth., vol. ix, p. 701, n. 240 (1823) ; *Lycæna lysimon*, Herrich-Schäffer, Schmett. Eur., vol. i, p. 118, pl. v, figs. 28, 29, *male* and *female* (1843) ; id., Westwood, Gen. Diurn. Lep., vol. ii, p. 492, n. 93 (1852) ; id., Staudinger, Hor. Soc. Ent. Ross., vol. xiv, p. 239 (1878) ; id., Elwes, Proc. Zool. Soc. Lond., 1881, p. 888 ; id., Lang, Butt. of Eur., p. 111, n. 16, pl. xxiv, figs. 3, *male* and *female* (1884) ; id., Trimen, South-Afr. Butt., p. 45, n. 140 (1887) ; *Plebeius lysimon*, Kheil, Rhop. Ins. Nias, p. 30, n. 93 (1884) ; *Lycæna galba*, Lederer, Verh. zool.-bot., Gesellsch. Wien, vol. v, p. 190, pl. i, fig. 4, *male* (1855) ; *L. knysna*, Trimen, Trans. Ent. Soc. Lond., third series, vol. i, p. 282 (1862) ; idem, id., Rhop. Afr. Aus., vol. ii, p 255, n. 156 (1866) ; *Zizera knysna*, Butler, Proc. Zool. Soc. Lond., 1884, p. 484, n. 15.

HABITAT : South France, Spain (Andalusia and Granada), Western Asia, China, Africa, part of Australasia (*Lang*) ; Asia Minor (*Staudinger*) ; Beirut, Syria (*Lederer*) ; China (*Elwes*) ; Mauritius, Madagascar, Bengal, Java, Timor (*Westwood*) ; South, South Tropical, North Tropical, Extra-Tropical North Africa (*Trimen*) ; Aden (*Butler*) ; Nias Island (*Kheil*).

EXPANSE : ♂, ♀, ·8 to 1·0 inch (Indian specimens).

DESCRIPTION : "MALE. UPPERSIDE, *both wings* dull violet, with a silky gloss, outer margin rather widely bordered with blackish. *Cilia* broad, whitish. *Forewing*, costa very narrowly edged with a white line. UNDERSIDE, *both wings* whitish-grey, ocelli blackish, whitish-ringed ; a sinuate row of ocelli beyond the middle, a whitish-edged fuscous streak closing the discoidal cell, a distinct ocellus in the cell (sometimes an indistinct ocellus below it), and two rows of pale fuscous, indistinctly whitish-edged, lunular spots along outer margin. *Hindwing*, three minute ocelli near the base, forming with that in the discoidal cell a short row across the wing, base blackish-dusted. FEMALE. UPPERSIDE, *both wings* greyish-brown, inner marginal area more or less dusted with violet-blue from the base. *Forewing*, a fuscous line closing the discoidal cell. UNDERSIDE, *both wings* quite similar to those of the male, but all the spots more conspicuous, especially the marginal lunular rows. *Forewing*, spot below that in the discoidal cell always present, often distinct." (*Trimen*, l. c. in Trans. Ent. Soc. Lond.) The spot below the cell on the underside of the forewing is extremely rare in Indian specimens, and does not occur always in the female.

LARVA when full-fed less than half an inch in length, green, onisciform, densely covered with short whitish tubercles, from which spring somewhat long colourless hairs ; head small, black, and shining ; a dorsal line of a somewhat darker shade of green than the ground, no other distinctive markings whatever. The usual extensile organs on the twelfth segment. Feeds in Calcutta on *Amarantus viridis*, Linnæus. Dr. Augustus Forel, of Zurich, has identified the ant which attends the larva as *Tapinoma melanocephalum*, Fabricius. PUPA pale green, of the usual lycænid shape, covered with a few short scattered colourless hairs. The transformations of this species appear to be here described for the first time.

From the list of localities inhabited by this species given by entomologists, it will be seen how great is its range. To these localities I add the outer Himalayas at low elevations, throughout continental and peninsular India, Ceylon, Assam, and the Nicobar Islands ; but not, as far as is known, in the Andaman Isles or Burma, though it probably occurs in the latter region, as Mr. Butler records it under the name of *Z. karsandra* from the Malay Peninsula. As in the case of *Z. maha*, I have not added to the synonymy of *Z. lysimon* the different names by which the latter, in my opinion, has been discriminated in India, preferring to give descriptions of them with remarks by various writers separately. As usual, there appears to be a good deal of seasonal dimorphism in this species. Male specimens taken in Calcutta

in the dry-season have the outer black margin on the upperside of both wings very narrow, while those occurring in the rains have it fully if not more than twice as broad; this variation has been remarked also by Mr. Trimen in South African specimens. The females are very variable too—some being entirely black, others having a great deal of blue on the upperside. The underside of both sexes varies in the tint of the ground and in the intensity of the markings, but, as long as the markings are visible at all, the species cannot be mistaken for any other. In some specimens found in the height of the dry-season, the markings of the underside are quite obliterated.

The figure shows both sides of a female specimen in my collection from Bholahât, Malda.

700. Zizera karsandra, Moore.

Polyommatus karsandra, Moore, Proc. Zool. Soc. Lond., 1865, p. 505, n. 106, pl. xxxi, fig. 7, *female*; id., Wood-Mason and de Nicéville, Journ. A. S. B., vol. l, pt. 2, p. 235, n. 42 (1881); *Lycæna karsandra*,* Felder, Verh. zool.-bot. Gesellsch. Wien, vol. xviii, p. 282 (1868); id., Butler, Trans. Linn. Soc. London, Zoology, second series, vol. i, p. 548, n. 3 (1877); *Zizera karsandra*, Moore, Lep. Cey., vol. i, p. 78, pl. xxxv, figs. 6, 6a, *male* (1881); id., Distant, Rhop. Malay., p. 213, n. 2, pl. xxii, fig. 22, *male* (1884); id., Swinhoe, Proc. Zool. Soc. Lond., 1884, p. 506, n. 24; idem, id., l. c., 1885, p. 132, n. 59; idem, id., Trans. Ent. Soc. Lond., 1885, p. 341, n. 23; id., Butler, Proc. Zool. Soc. Lond., 1886, p. 367, n. 47; id., Swinhoe, l. c., p. 426, n. 44; id., Doherty, Journ. A. S. B., vol. lv., pt. 2, p. 133, n. 178 (1886).

HABITAT: Plains of N.-W. India (*Moore*); Ceylon (*Felder* and *Moore*); Karachi, April and May, August, November and December; Poona, September to April; Bombay, August; Sattara, November; Ahmednuggur, August to November; Metazai, South Afghanistan, May; Mhow, October to May; Quetta, Sukkur, Punjab, Aden (*Swinhoe*); Penang; Campbellpore, May and June, Murree, October (*Butler*); Ranibagh, Bagheswar, 1—4,000 feet, Kumaon (*Doherty*); Kamorta, Nicobar Isles (*Wood-Mason* and *de Nicéville*).

EXPANSE: ♀, ·83 inch.

DESCRIPTION: FEMALE. "UPPERSIDE, *both wings* purple-brown. UNDERSIDE, *both wings* greyish-brown, exterior margins defined by a brown line. *Forewing* with a spot within discoidal cell, a disco-cellular streak, a spot above it, and a transverse discal series of six spots black, each encircled with white; a marginal and submarginal row of pale brown, white-bordered lunules. *Hindwing* with a series of twelve black spots, and a pale disco-cellular streak, encircled with white; a marginal row of pale brown, whitish-encircled spots, and a submarginal row of whitish lunules. *Cilia* greyish-brown." (*Moore*, l. c. in Proc. Zool. Soc. Lond.)

"A common species in the plains, from Oudh to the Punjab." (*Note by Colonel A. M. Lang, R.E.*)

"Colombo, Ceylon; in gardens and grassy land. Almost always abundant. Hovers round weeds and plants, and constantly settling on the ground" (*Hutchison*).

"The commonest *Lycæna* in Karachi. It occurs in great plenty in April and May, a few in August, and then again in countless numbers throughout November and December." (*Swinhoe*, l. c., Proc. Zool. Soc. Lond., 1884).

"This insect is very variable in colour; the type [a female] is brown. Irrespective of sex, the colour varies from blue to dark brown. I have many examples from Quetta, Metazai, Sukkur, Karachi, the Punjab, Central India, the Deccan, and also from Aden, of many shades of colour, quite impossible to separate." (*Swinhoe*, l. c., Proc. Zool. Soc. Lond., 1886).

"The commonest *Lycæna* in Karachi It occurs in great plenty in April and May, and again in countless numbers in November and December." (*Swinhoe*, Journ. Bomb. Nat. Hist. Soc., vol. ii, p. 273, n. 27 (1887).

Colonel Lang reports that *Z. karsandra* is "not common in Kumaon. Taken on top of Cheena, 8,600 feet, on 9th June; at Bhowali, 6,500 feet, on 16th May; at Khairna, Kosi Valley, on 18th July. Taken also at Lucknow in November, and Bareilly in December."

* Felder places his *Lycæna brahmina* as a synonym of *Lycæna karsandra*. It really is the dry-season form of *Chilades laius*, Cramer. (See page 89, *antea*.)

701. **Zizera mora,** Swinhoe.

Z. mora, Swinhoe, Proc. Zool. Soc. Lond., 1884, p. 506, n. 25, pl. xlvii, fig. 2.

HABITAT : Karachi, June, 1879 ; June, 1882.

EXPANSE : 1·0 inch (from the figure).

DESCRIPTION : " Similar in shape and colour above and below to *Z. karsandra*, Moore, but larger ; the markings below are very different and quite distinct. UNDERSIDE, *forewing* with a black spot within the cell and a black mark at the end of the cell, and beyond this a row of six black thick longitudinal streaks between the veins, spear-shaped with the points outside, running from near the costa to near the hinder margin, and a small longitudinal subcostal streak slightly above and behind this row. *Hindwing* with a subcostal spot one-third from the base, a streak within the cell, another adjoining a mark at the end of the cell, and a whorl of streaks outside corresponding to the row on the forewing—the first streak subcostal, very long, the second a little shorter, the next four less than half the length, and three more mere spots, each lessening in size ; all the streaks and spots deep black, surrounded with white and distinctly separated from each other, giving the outer row of streaks on both wings the appearance of being stamped on a broad white band. *Both wings* with a submarginal row of spots slightly darker than the ground-colour of the wings on a greyish ground."

" I thought at first it was merely an aberration of *Z. karsandra*, Moore ; but as I have taken examples two years running, marked exactly similarly, and not at any other period of the year, it is clearly a distinct form. The Calcutta Museum has also a specimen received from Karachi." (*Swinhoe*, l. c.)

Z. mora is a " sport " or aberration of *Z. lysimon*, Hübner, such as frequently occurs amongst the *Lycænidæ*, as has been pointed out with regard to the genus *Lycæna* by Dr. Lang as follows : " Variations very frequently occur. On the underside the spots are very liable to enlargement or coalescence, or to be elongated into dashes or streaks, often producing a very remarkable appearance."* In the description of *Z. mora*, Colonel Swinhoe does not give the sexes of the specimens he describes ; they are probably females however. The one referred to in the Indian Museum, Calcutta, is a female, and has the spots of the underside even more curiously shaped and enlarged than the specimen figured. I possess another female of the same type from Bholahât, Malda, and a male from the Hanna Pass, 6,000 feet, taken in September by Colonel A. M. Lang, which shows a tendency towards the elongation of the spots.

702. **Zizera gaika,** Trimen. (PLATE XXVI, FIG. 174 ♀).

Lycæna gaika, Trimen, Trans. Ent. Soc. Lond., third series, vol. i, p. 403 (1862) ; idem, id., South-Afr. Butt., vol. ii, p. 50, n. 143 (1887) ; *Zizera gaika*, Butler, Proc. Zool. Soc. Lond., 1884, p. 484, n. 16 ; *Lycæna lysimon*, Wallengren (*nec* Hübner), Kong. Svens. vet.-akad. Handl., second series, vol. ii, Lep. Rhop. Caffr., p. 39, n. 8 (1857); id., Trimen, Rhop. Afr. Aust., vol. ii, p. 256, n. 158, pl. iv, fig. 7, *male* (1866) ; *L. pygmæa*, Snellen, Tijd. voor Ent., vol. xix, p. 163, n. 50, pl. vii, fig. 3 (1876) ; *Zizera pygmæa*, Moore, Lep. Cey., vol. i, p. 79, pl. xxxv, figs. 5, 5*a*, *male* (1881) ; idem, id., Proc. Zool. Soc. Lond., 1882, p. 245 ; id., Butler, l. c., 1883, p. 149, n. 17 ; id., Swinhoe, l. c., 1884, p. 507, n. 26 ; idem, id., l. c., 1885, p. 132, n. 60 ; idem, id., 1886, p. 427, n. 46 ; id., Moore, Journ. Linn. Soc. Lond., Zoology, vol. xxi, p. 39 (1886) ; id., Doherty, Journ. A. S. B., vol. lv, pt. 2, p. 133, n. 175 (1886) ; id., Distant, Rhop. Malay., p. 454, n. 3, woodcut no. 126, *male* (1886).

HABITAT : South and South Tropical Africa, Aden, Western Himalayas, continental and peninsular India, Ceylon, Burma, Malay Peninsula, Andaman Isles, Sumatra, Java.

EXPANSE : ♂, ♀, ·6 to 1·0 inch.

DESCRIPTION : " MALE. UPPERSIDE, *both wings* pale blue, a narrow brownish-grey border on the outer margin. *Cilia* whitish. UNDERSIDE, *both wings* whitish-grey, with minute, whitish-ringed, blackish spots ; a thin, greyish, whitish-edged mark closing the discoidal cell ; a transverse row of spots beyond the middle (that of the forewing strongly curved, commencing with two minute spots on the costa before the middle, and reaching to the submedian nervure ;—that of the hindwing composed of eight spots, from the costa about the middle to the inner margin) ; two dentate, submarginal, lunular, greyish, whitish-edged lines ;

* Butt. of Eur., p. 98 (1884).

and a thin, black, bounding line immediately within the cilia. *Hindwing* with a basal black spot; before the middle a transverse row of three spots; no metallic-centred spots near the anal angle." FEMALE. UPPERSIDE, *both wings* smoky-black with a slight gloss, never with any blue coloration towards the base. UNDERSIDE, *both wings* precisely as in the male.

"This *Lycæna* seems allied to *L. acca*, Westwood [=*Zizera messapus*, Godart, from South and North Tropical Africa], but the wings are longer and of more delicate texture, and the abdomen also is more slender and elongate than in most of the genus." (*Trimen*, l. c. in Trans. Ent. Soc. Lond.)

Like the two preceding species, *Z. gaika* has a wide range. It is a very small butterfly—the smallest in India—and has a feeble low flight amongst grass and herbage, and is therefore very likely to be overlooked; it is probable that its range will hereafter be found to be considerably extended. In Calcutta, at any rate, it is distinctly rarer than any of its congeners; you may net many a *Zizera* of the three other species before you will find a single *Z. gaika*. Colonel Swinhoe records it from Karachi, July, not common; Bombay, November; Poona, January to March; Mhow, September to December. Mr. Moore records it from Ceylon, "found in the same localities and has the same habits as *Z. karsandra*" [= *lysimon*]; Mergui, March; Thapo, King Island, January; Elphinstone Island, March (these localities are in the Mergui Archipelago). Mr. Doherty records it from Ranibagh, 1,000 feet, Kumaon. To these localities I can add Simla (*Dr. E. R. Johnson*); Bholahât, Malda (*W. H. Irvine*); Sikkim (*Otto Möller*); Orissa (*W. C. Taylor*); Ganjam and Sirur (*E. A. Minchin*); Bhadrachalam (*the late G. Nevill*); Ootacamund (*G. F. Hampson*); the Andaman Isles (*the late A. R. de Roepstorff*); and Rangoon (*Phayre Museum*). I have not given a description of *Z. pygmæa* separately, as I think no one will dispute the fact that it is an absolute synonym of *Z. gaika*.

The figure shows both sides of a female example from Ootacamund in my collection.

703. **Zizera otis**, Fabricius. (PLATE XXVI, FIG. 175 ♂).

Papilio otis, Fabricius, Mant. Ins., vol. ii, p. 73, n. 689 (1787); *Hesperia otis*, id., Ent. Syst., vol. iii, pt. 1, p. 296, n. 127 (1793); *Lycæna otis*, Butler, Cat. Fab. Lep. B. M., p. 169, n. 7, pl. ii, figs. 8, 11 (1869); *Zizera otis*, Butler, Ann. and Mag. of Nat. Hist., fifth series, vol. xviii, p. 186, n. 29 (1886); *Polyommatus (Cupido) otis*, Westwood, Trans. Ent. Soc. Lond., 1888, p. 471, n. 15; *Lycæna lysizone*, Snellen, Tijds. voor Ent., vol. xix, pp. 152, 161, n. 49, pl. vii, figs. 2, 2*a* (1876); id., Butler, Trans. Linn. Soc. Lond., Zoology, second series, vol. i, p. 548, n. 2 (1877); *Zizera lysizone*, Distant, Rhop. Malay., p. 212, n. 1, p. 197, woodcut no. 58, *part of neuration of forewing*, pl. xx, fig. 9, *male* (1884).

HABITAT: Sheemagar, Mòdah, Upper Burma, December and January; Sungei Ujong; Malacca; Penang; Singapore; Sumatra; Java; Northern Celebes; Hong-Kong.

EXPANSE: ♂, ♀, ·70 to ·95 of an inch (*Distant*).

DESCRIPTION: MALE. "UPPERSIDE, *both wings* pale violaceous. *Forewing* with the costal area pale brownish, the outer margin (widest at apex) broadly dark brown. *Hindwing* with the costal area broadly pale brownish, the posterior margin (narrowing to anal angle) dark brownish. *Cilia* of both wings greyish, darker at base. UNDERSIDE, *both wings* pale brownish-ochraceous. *Forewing* with a linear brown spot margined with grey at the end of the cell, and a curved series of six brown spots margined with grey, placed between the nervules, and situated midway between the end of the cell and the outer margin, the uppermost situated between the bifurcation of the third and fourth subcostal nervules, the sixth (sometimes duplex and sometimes absent) placed above the submedian nervure; the outer margin darker and containing two dark waved lines. *Hindwing* with a linear spot at the end of the cell as on the forewing, and with the following series of brown spots margined with grey:—three near the base, two above and beyond the cell, five midway between the cell and the posterior margin, the first situated beneath the lower subcostal nervule, the fifth before the submedian nervure, and a smaller spot above the middle of the abdominal margin; posterior margin darker and marked as on the forewing. *Body* above and beneath more or less concolorous with the wings. FEMALE. UPPERSIDE, *both wings* pale brownish, with a broad violaceous streak at the base. UNDERSIDE, *both wings* as in the male."

"I have received a fine series of this species, which proves (as could be reasonably expected) that the species is subject to considerable variation both in size and in the distinctness of the markings on the underside of the wings. It also appears to be a very abundant lycænid in the Malay Peninsula." (*Distant*, l. c.)

The correct identification of this species seems to have puzzled several writers. Mr. Elwes* says that Mr. Moore refers specimens from Shanghai of *L. argia*, Ménétriés, to *L. otus* [=*L. otis*], Fabricius. *L. argia* is almost certainly a synonym of *Z. maha*, Kollar, which can have nothing to do with the present species. Again Mr. Trimen† says that *L. lysimon*, Hübner, is probably "the *otis* of Fabricius (1787), but it is impossible to decide the point from that author's descriptions." If Mr. Butler is correct in saying ‡ that "*L. lysizone*, Snellen, is identical with" *Z. otis*, Fabricius, then the latter species cannot be confounded with *Z. lysimon*, though Mr. Butler remarks § that *L. otis*, "though allied to *L. lysimon*, Hübner, is sufficiently distinct to rank as a species."

I propose, as in the case of *Z. maha*, Kollar, and *Z. lysimon*, Hübner, to keep separately the different descriptions and names which have been applied synonymically in my opinion to this species. As pointed out by Mr. Distant, there is much variability in this species; in the male the outer black border to the wings on the upperside is sometimes narrow, sometimes very broad; the female has sometimes much blue at the base of the wings on the upperside, sometimes none at all. The markings of the underside in both sexes vary too; in some specimens they are quite obsolete, rendering identification very difficult, in others they are very prominent. I have no doubt that much of this variation is due to seasonal causes; the specimens which are inconspicuously marked on the underside occurring in the dry and cold seasons, the prominently marked ones in the rains, and so on.

In the "Habitat" above I have given only the localities recorded by the authors referred to in the synonymy of the species, but taken in the broad sense in which I view it, *Z. otis* occurs in the outer Himalayas, throughout continental and peninsular India, in Ceylon, the Andaman and Nicobar Isles, Assam, from the Chittagong district to Singapore, in Java, and in China.

I have bred the larva of this species in Calcutta, but made no notes regarding it. It is very similar to the larva of *Z. maha*, and feeds on *Alysicarpus vaginalis*.

The figure shows both sides of a male specimen in my collection from Khurdah, Orissa.

704. **Zizera sangra**, Moore.

Polyommatus sangra, Moore, Proc. Zool. Soc. Lond., 1865, p. 772, pl. xli, fig. 8, *male*; idem. id., l. c., 1877, p. 588; *Lycæna sangra*, Butler, Proc. Zool. Soc. Lond., 1880, p. 668, n. 16; idem, id., Journ. Linn. Soc. Lond., Zoology, second series, vol. i, p. 548, n. 4 (1877); *Zizera sangra*, de Nicéville, Journ. A. S. B., vol. liv, pt. 2, p. 46, n. 64 (1885); id., Doherty, l. c., vol. lv, pt. 2, p. 133, n. 176; id., Wood-Mason and de Nicéville, l. c., p. 365, n. 112; id., Moore, Journ. Linn. Soc. Lond., Zoology, vol. xxi, p. 39 (1886); id., Swinhoe, Proc. Zool. Soc. Lond., 1886, p. 427, n. 47.

HABITAT: Bengal; Port Blair, South Andamans; Kamorta, Nicobars; Mergui Archipelago (*Moore*); Calcutta, Sikkim (*de Nicéville*); Cachar; Andamans and Nicobars (*Wood-Mason* and *de Nicéville*); Ranibagh, Jhulaghat, 1—2,000 feet, Kumaon (*Doherty*); Mhow, October to February (*Swinhoe*); Malacca, Penang, Formosa (*Butler*).

EXPANSE: ♂, ·7 inch.

DESCRIPTION: "MALE. UPPERSIDE, *both wings* pale purple-blue, the exterior margin pale purple-brown. *Cilia* pale grey. UNDERSIDE, *both wings* pale grey. *Forewing* with a blackish white-bordered streak closing the cell, a row of transverse discal spots, a marginal and submarginal row of lunules. *Hindwing* with markings the same, and with an additional subbasal row of three similar spots. *Palpi* and *body* beneath and *legs* white." (*Moore*, l. c. in Proc. Zool. Soc. Lond., 1865.)

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* Proc Zool Soc. Lond., 1881, p. 888.

† South-Afr. Butt., vol. ii, p. 46 (1887).

‡ Ann. and Mag. of Nat. Hist, fifth series, vol. xviii, p. 186, n. 29 (1886).

§ Cat. Fab. Lep. B. M., p. 169, n 7 (1869).

"Varies much in size in different localities. I have four definite uniform sizes taken in four different parts of India; some are slightly paler than others, but otherwise all are identical. The uniform manner in which almost all the different Indian species of *Zizera* are marked on the wings below is very curious. *Z. pygmæa* [=*Z. gaika*] has markings peculiar to itself, but *Z. maha*, *Z. chandala*, *Z. karsandra* and *Z. dicreta* [=*decreta*] have the spots below arranged in almost exactly the same manner, *Z. sangra* differing from the others merely in the absence of the spot inside the cell." (*Swinhoe*, l. c.)

I do not entirely agree with Colonel Swinhoe's remarks above regarding the uniformity of the markings in the Indian species of *Zizera*. When closely studied they are found to differ materially in detail.

705. Zizera indica, Murray.

Lycæna indica, Murray, Trans. Ent. Soc. Lond., 1874, p. 525, pl. x, figs. 2, *male*; 3, *female*; id., Butler, Proc. Zool. Soc. Lond., 1880, p. 668, n. 17; *Zizera indica*, Moore, Lep. Cey., vol. i, p 79, pl. xxxv, figs. 7, 7*a*, *male* (1881); idem, id., Proc. Zool. Soc. Lond., 1882, p. 245; id., Butler, l. c., 1883, p. 149, n. 18; id., Swinhoe, l. c., 1885, p. 132, n. 58.

HABITAT: Allahabad (*Murray*); Ceylon; N.-W. Himalayas (*Moore*); Mhow, December and January; Formosa (*Butler*); Poona, December to June; Ahmednuggur, June (*Swinhoe*).

EXPANSE: ♂, ·75 to ·83; ♀, ·75 to ·92 of an inch.

DESCRIPTION: "MALE. UPPERSIDE, *both wings* blue. *Forewing* with a narrow costal and somewhat broad hind-marginal brown border. *Hindwing*, with a similar brown border, broad on costa, narrow on hind-margin. UNDERSIDE, *both wings* grey-brown. *Forewing*, no spot between base and disco-cellular spot, which is brown, edged on both sides by white; a conspicuous discal row of six black spots, ringed with white; of these the lowest is less distinct and is geminated; a double hind-marginal series of brown lunules, of which the inner is surmounted by whitish, and the outer edged on both sides by the same colour. *Hindwing*, a basal row of three spots, a disco-cellular spot, and an angulated discal row of eight spots, all brown, narrowly surrounded by whitish. Hind-marginal markings as on forewing. *Cilia* pale brown, unspotted. FEMALE. UPPERSIDE, *both wings* brown, blue at base. UNDERSIDE, *both wings* as in the male."

"This insect seems to be very common in the neighbourhood of Allahabad, as I possess a considerable series, collected there by my brother. I have failed to find it anywhere described, and Mr. Moore has also expressed his belief that it is a new species. It belongs to the *Z. lysimon* group. But for Mr. Moore's repeatedly expressed opinion that this insect was undescribed, I should have been inclined to doubt whether it were distinct from his *L. sangra*." (*Murray*, l. c.)

"We are quite unable to say how *Z. indica*, Murray, differs from *Z. sangra*, Moore. (*Wood-Mason* and *de Nicéville*, Journ. A. S. B., vol. lv, pt. 2, p. 365, n. 112 (1886).

There is no doubt that this species is strictly synonymous with *Z. sangra*, which again is a synonym of *Z. otis*, Fabricius. Colonel Swinhoe places *Z. sangra* and *Z. indica* together (*vide* Proc. Zool. Soc. Lond., 1886, p. 427, n. 47). It has nothing whatever to do with *Z. karsandra*, though Mr. Butler in the following note appears to think that it has. "Colonel Swinhoe separates this [*Z. indica*] into two forms, between which, however, I fail to see any constant difference. The species is very close to *Lycæna* [=*Zizera*] *karsandra*, Moore, of which I think it possible that it may be only a variety; the ocellated marginal series of dusky spots on the underside of the hindwing, however, are less defined than in *L.* [= *Z.*] *karsandra*. Of the first series of specimens Colonel Swinhoe says, 'Very common here [Mhow] in December and January;' and of the second, 'Not common here, only eight taken in December and two in January; is smaller than any Karachi examples of Moore's *karsandra*, and has a tinge of blue in the fresh specimens which I never observed in the Karachi ones.' I must confess my inability to admit the first of these differences: some of the Karachi specimens which Colonel Swinhoe sent us are certainly as large as some of the Mhow specimens of *Z. indica*; the blue spot [? shot], however, is certainly brighter in the latter."

706. **Zizera decreta,** Butler.

Z. indica, var. *decreta*, Butler, Proc. Zool. Soc. Lond., 1883, p. 150; *Z. decreta*, Swinhoe, l. c., 1886, p. 427, n. 45.

HABITAT: Mhow, December and January (*Butler*); Mhow, October to May (*Swinhoe*).

EXPANSE: ·7 to ·8 of an inch.

DESCRIPTION: "Smaller and paler than *Z. indica*, Murray; the discal series of black spots across the UNDERSIDE of the *forewing* always very large; the other markings badly defined."

"I am inclined to agree with Colonel Swinhoe that this is probably a small form of the preceding. It appears, however, to be a 'very common' one, and therefore may turn out to be as distinct as our *Ganoris brassicæ* and *G. rapæ* [two butterflies of the subfamily *Pierinæ* or "Whites"] are when its life-history has been studied. It is impossible to be sure, from a mere examination of the imago, whether a butterfly or moth is a variety or a species: perhaps one of the best proofs of this may be found in the Geometrid genus *Eugonia* (*Ennomos* auct.), where the moths differ far less than the authenticated varieties of species in other genera (such as *Abraxas* for instance), yet the larvæ are widely distinct both in form and colouring." (*Butler*, l. c.)

As Colonel Swinhoe has erected this variety into a separate species, I keep it distinct; it is neither better nor worse than several of the so-called "species" which have preceded it.

Genus 112.—AZANUS, Moore. (PLATE XXVI).

Azanus, Moore, Lep. Cey., vol i, p. 79 (1881).

"FOREWING, elongated, triangular; *costa* almost straight, *apex* acute, *exterior margin* oblique and slightly concave, *inner* margin short, *inner angle* acute; *costal nervure* curved in its middle, and slightly bent before reaching the costa; *first subcostal nervule* emitted at one-third before the end of the cell, anastomosed to the costal nervure for a short distance near its end, *second* subcostal at one-sixth, *third* and *fifth* subcostals at the end of the cell, *fourth* subcostal at one-half beyond and terminating at the apex; *disco-cellular* nervules very slender; [*lower*] *discoidal* nervule from their middle; *discoidal cell* long; *second median nervule* emitted before the end of the cell, *first* median at one-third before its end; *submedian nervure* straight. HINDWING, small, short; *apex* convex, *anal angle* acute, *abdominal margin* short; *costal nervure* much curved at the base, extending to the apex; *first subcostal nervule* emitted at one-fourth before the end of the cell; *disco-cellular* nervules very slender; *discoidal* nervule from their middle; *discoidal cell* somewhat short, broad; *third* and *second* median nervules emitted from the end of the cell, *first* median at one-half before its end; *submedian* and *internal nervures* straight; no *tail*. *Thorax* robust, woolly; *abdomen* short. *Palpi* porrect; second joint long, laxly pilose beneath, extending half its length beyond the head; third joint slender, squamose, half the length of the second. *Legs* slender, *tarsi* five-jointed and finely spined beneath. *Antennæ* with a prominent spatular club. Type, *A. ubaldus*, Cramer." (*Moore*, l. c.)

I should describe the subcostal nervules of the forewing as follows:—first emitted at about one-third before the end of the cell, strongly bent upwards soon after its origin and completely anastomosing with the costal nervure for a short distance, then free; second much nearer the base of the first than to the base of the upper discoidal; third emitted about midway between the apices of the cell and the wing; what Mr. Moore calls the fourth subcostal nervule is the terminal portion of the subcostal nervure, which extends to the apex of the wing; his fifth is the upper discoidal, which is emitted from the subcostal nervure some distance before the apex of the cell; consequently there is no upper disco-cellular nervule; the third median nervule is much bowed; the second median nervule of the hindwing originates some little distance before, not at the apex of the cell, as stated by Mr. Moore, and the outer margin of the forewing is convex, not concave.

But few entomological writers have used the genus *Azanus*; I therefore find some difficulty in giving its distribution. One species certainly occurs in Somali land and Aden, as well as in

India and Ceylon ; another appears to be purely Indian ; while a third species occurs in Africa, Syria, India, and Ceylon ; two more are purely African. If, as is probable, the four species of Mr. Trimen's Section E. of the genus *Lycæna** belong to the genus *Azanus*, then the genus will be further extended into South, and South and North Tropical Africa. No species appears to occur in Europe, or eastwards of Bengal. In India three species occur ; they are all small, not more than an inch in expanse ; males blue on the upperside, one species with a somewhat broad outer pale fuscous border ; underside pale brownish, with numerous bands and spots. The females as usual have the blue coloration of the upperside more or less restricted to the base, or absent altogether. The transformations of no species have been described.

Key to the Indian species of Azanus.

A. Underside with no blackish spot near the middle of the cell of the forewing ; but with two small black dots on the costa above the spot on the disco-cellular nervules.

a. Male with the outer margins of both wings on the upperside broadly pale fuscous ; both sexes with the markings of the underside conspicuous.

707. A. UBALDUS, Somali-land, Africa ; Aden ; Western Himalayas ; Western and Southern India ; Ceylon.

b. Male with the outer margins of both wings on the upperside defined by a narrow anteciliary black line only ; both sexes with the black spots of the underside obsolete

708. A. URANUS, Biluchistan, Sind, Western Himalayas, Punjab, Oudh, Malda, Sikkim, Orissa, South India.

B. Underside with a prominent round black spot near the middle of the cell of the forewing ; no black dots on the costa above the spot on the disco-cellular nervules.

709. A. GAMRA, Abyssinia, Aden, Syria, Punjab, Kumaon, Central and South India, Ceylon.

707. Azanus ubaldus, Cramer.

Papilio ubaldus, Cramer, Pap. Ex., vol. iv, p. 209. pl. cccxc, figs. L, M, *male* (1782) ; id., Herbst, Pap., pl. cccxii, figs. 3, 4, *male* (1804) ; *Polyommatus ubaldus*, Godart, Enc. Méth., vol. ix, p. 682, n. 204 (1823) ; *Azanus ubaldus*, Moore, Proc. Zool. Soc. Lond., 1882, p. 245 ; id., Butler, l. c., 1886, p. 366, n. 41 ; id., Doherty, Journ. A. S. B., vol. lv, pt. 2, p. 132, n. 162 (1886) ; *Catochrysops ubaldus*, Butler, Proc. Zool. Soc. Lond., 1883, p. 149, n. 16 ; *Lycæna zena*, Moore, l. c., 1865, p. 505, n. 107, pl. xxxi, fig. 9, *female* ; *Azanus zena*, Butler, l. c., 1884, p. 483, n. 11 ; idem, id., l. c., 1885, p. 763, n. 18 ; idem, id., l. c., 1886, p. 365, n. 39 ; id., Swinhoe, l. c., 1884, p. 507, n. 28 ; idem, id., 1885, p. 134, n. 73 ; idem, id., 1886, p. 428, n. 57.

HABITAT : Coromandel Coast (*Cramer*); plains of N.-W. India ; N.-W. Himalayas (*Moore*) Karachi, July and August ; Poona, November to January and in August ; Ahmednuggur June, August, and September ; Mhow, January, April, May, September to November (*Swinhoe*) ; Ranibagh and Haldwani at the foot of the hills, Jhulaghat in the Kali Valley, 2,000 feet, Kumaon (*Doherty*) ; near Attock Bridge, Khairabad side, November ; Mhow, October and November ; Aden, March, June, September and November ; Huswah, near Aden, March and September ; Kutch ; Karachi ; Somali-land ; Campbellpore, Punjab, November (*Butler*). Throughout India generally, except in Bengal, Assam and Burma ; also in Ceylon.

EXPANSE : ♂, ♀, ·75 to 1·00 inch.

DESCRIPTION : MALE. UPPERSIDE, *both wings* shining bluish-purple. *Forewing* with the apex broadly and the outer margin decreasingly pale shining fuscous ; the blue scales on the disc apparently differently-formed to those on the rest of the wing, giving the appearance of a sexual streak or brand. *Hindwing* with the costal and outer margins somewhat broadly pale shining fuscous. UNDERSIDE, *both wings* exactly as in the female. FEMALE. "UPPERSIDE, *both wings* pale purple-brown. *Hindwing* with a small brown spot near the anal angle of the exterior margin. UNDERSIDE, *both wings* pale grey, exterior margins defined by a brown line. *Forewing*, with a black dot [always two] on the costa, one-third from apex, a disco-cellular spot, an interrupted transverse discal band, and a submarginal lunulated line pale brown, each with whitish borders. *Hindwing* with three subbasal spots, another on anterior margin, and two from anal angle black, encircled with white, a discal series of pale whitish lines, and a marginal row of white circles." (*Moore*, l. c. in Proc. Zool. Soc. Lond., 1865). Mr. Moore figured this species under the name of *L. zena* with a tail to each hindwing ; this is of course incorrect.

* South African Butterflies, vol. ii, p. 72 (1887).

Mr. Moore has himself sunk his *L. zena* as a synonym of the *Papilio ubaldus* of Cramer, as it is probable that when he described *A. zena* he was unaware that Cramer had figured it in the preceding century. Messrs. Butler and Swinhoe have not followed Mr. Moore in this matter, but keep *A. zena* distinct from *A. ubaldus*. As neither of these writers have indicated how these two supposed distinct species differ the one from the other—and I am unable to say from Cramer's figure what the distinctions are—I have followed Mr. Moore in uniting them under the older name, more especially as I can find no character by which to segregate my long series of specimens from far distant localities into two species.

A. ubaldus occurs in the Western Himalayas, Sind, the Punjab, the Deccan, Orissa, and again in South India (Bangalore, and the Nilgiri and Pulni Hills); and Mr. Francis A. Fairlie took a specimen in July at Jaffna in Ceylon, whence this species has not previously been recorded. Colonel A. M. Lang notes that it is "common in Oudh in the winter months, November to February. I have caught it also at Umballa, in the Punjab. It is not an Himalayan insect." This last remark is not quite correct, subsequent investigation having shown that it occurs on the outer ranges of the Himalayas. Major Yerbury has found it on Babul trees in October in the Punjab. Its transformations are undescribed, but Mr. W. C. Taylor of Orissa informs me that the "larva feeds on *Acacia leucophlœa*, a tree something like a Babul." Mr. Doherty (l. c., p. 112) states that, though the larvæ are attended by ants, the twelfth segment is not furnished with the usual protrusible bunches of hairs. It may be that in this species these organs have become entirely aborted from disuse through being no longer required (owing to the vigilant protection of the ants) to frighten away enemies.

708. **Azanus uranus**, Butler.

A. uranus, Butler, Proc. Zool. Soc Lond., 1886, p. 366, n. 40, pl. xxxv, fig. 1, *male*; idem, id., Ann. and Mag. of Nat. Hist, sixth series, vol. i, p. 146, n. 44 (1888).

HABITAT: Hassan Abdal, 13th October; Campbellpore, 8th June, 29th October, 17th, 21st and 29th November, Punjab; Chitta Pahar, Lumbahdoon, 2,000 feet, 28th November (*Butler*); Karachi, three taken in August, 1885, and one taken by Captain Becher, in the Hubb River in September, 1885 (*Swinhoe*); Oudh; Malda district; Kumaon; Sikkim; Orissa; Madras; and the Deccan.

EXPANSE: ♂, ♀, ·8 to ·9 of an inch.

DESCRIPTION: "MALE. Allied to *A. zena*, Moore [= *A. ubaldus*, Cramer], but differing from all specimens in the [British] Museum series, or that of Mr. Moore's collection, in the much brighter and more uniform lilac colour of the UPPERSIDE (in *A. zena* it is chiefly confined to the middle of the wings, and has almost the appearance of a brand); in the brighter blue at the base, the browner tint of the UNDERSIDE, on which the white-edged markings are consequently less well-defined; and in the obsolete character of the black spots, which are either reduced to minute points or wholly absent." (*Butler*, l. c. in Proc. Zool. Soc. Lond.) FEMALE. UPPERSIDE, *both wings* blue on the disc and base, the costa and outer margins broadly pale fuscous. UNDERSIDE, *both wings* like the male.

"*A. uranus* and *A. ubaldus* agree in the uniform lilac colouring of the upperside in the male; but the pattern of the underside and the colouring of the female on both sides in *A. ubaldus* much more nearly agrees with *A. zena*; indeed, though the males of *A. zena* and *A. ubaldus* are as unlike and as easy to separate as any two species of *Lycæna*, the females may readily be confounded. The female of *A. uranus* is either pale copper-brown suffused with lilac, or lilac bordered with copper-brown, on the upperside; on the underside it only differs from the male in having the black spots of the hindwing rather better defined; the bands on the underside are (as in the male) grey, whereas in *A. zena* and *A. ubaldus* they are copper-brown; the pattern of the bands differs chiefly in their more macular character." (*Butler*, l. c. in Ann. and Mag. of Nat. Hist.)

A. uranus appears to be a perfectly good and distinct species. Colonel Swinhoe has recorded it from Biluchistan, it occurs at Karachi in Sind, several places in the Punjab, at Faizabad in Oudh, Mr. W. H. Irvine has sent me a long series of both sexes taken at Bholahât in the Malda district, Mr. Otto Möller has taken it in the Sikkim terai in July and August,

Mr. W. C. Taylor has taken it in Orissa in January, August, and September, and lastly Mr. E. A. Minchin has found it at Sirur in the Deccan in February. Colonel Swinhoe possesses specimens from Poona and Mhow also.

709. **Azanus gamra,** Lederer. (PLATE XXVI, FIG. 176 ♂).

Lycæna gamra, Lederer, Verh. zool.-bot. Gesellsch. Wien, vol. v, p 189, pl. i, fig. 3, *male* (1855); *Azanus gamra*, Doherty, Journ. A. S. B., vol. lv, pt. 2, p. 132, n. 163 (1886); *Azanus crameri*, Moore, Lep. Cey., vol. i, p. 80, pl. xxxvi, fig. 1 (1881); *Azanus ubaldus*, Swinhoe (*nec* Cramer), Proc Zool. Soc Lond., 1885, p 134, n. 72; idem, id., l. c., 1886, p. 428, n. 56; *Lampides sigillata*, Butler, Ann. and Mag. of Nat. Hist., fourth series, vol. xviii, p. 483 (1876); *Azanus sigillata*, id., Proc. Zool. Soc. Lond., 1884, p. 483, n. 11.

HABITAT: Syria (*Lederer*); Haldwani, Kumaon (*Doherty*); Ceylon (*Moore*); Poona, November and January; Mhow, January, April, and May (*Swinhoe*); Abyssinia; White Nile; Aden, January and February (*Butler*); Punjab; Orissa; Madras; South India.

EXPANSE: ♂, ♀, ·83 to 1·00 inch.

DESCRIPTION: "MALE. UPPERSIDE, *both wings* pale purple-blue, exterior margins defined by a slender black line. *Cilia* white. UNDERSIDE, *both wings* pale brownish-grey, outer marginal line black. *Forewing* with a brown basal streak below the costal nervure, a white-bordered blackish spot within the cell, and a less distinct spot below it, a disco-cellular pale-bordered brown streak, a transverse subapical white-bordered brown band broken at its lower end, a marginal row of brown pale-bordered spots, and an inner white submarginal lunular line. *Hindwing* with a white-bordered black clavate basal streak, three subbasal spots, two spots on the middle of the abdominal margin, a costal spot, and an outer marginal row of spots, the two from the anal angle speckled with metallic green; a curved disco-cellular and a discal pale-bordered brown catenulated band. FEMALE. UPPERSIDE, *both wings* pale violet-brown, the basal areas pale violet-blue. *Forewing* with a whitish-bordered brown disco-cellular spot. *Hindwing* with a marginal row of indistinct pale-bordered blackish spots. UNDERSIDE, *both wings* as in the male. *Palpi* above black. *Legs* with black tarsal bands."

"This is a comparatively broader insect than *A. ubaldus*, Cramer, the forewing is also less acuminate at the apex, and the underside has additional spots towards the base." (*Moore*, l. c.)

The above description applies in every respect to specimens of both sexes of *A. gamra* from Beirut, Syria, and *A. crameri* from Ceylon, and to males of *A. sigillata* from Aden identified by Mr. Butler himself. Colonel Swinhoe has recorded this species in error in two places as *A. ubaldus*. *A. gamra* is a very distinct species, the spot in the cell of the forewing on the underside in both sexes and usually the spot below it (in some examples this latter is wanting) serving at once distinguish it from *A. ubaldus* and *A. uranus*. In addition to the localities given above, I have specimens from Umballa, Orissa, Ganjam, Dumagadin, Bhadrachallam, Bangalore, and Radgodi. It does not appear to occur anywhere in Bengal proper or to the eastwards. In Ceylon it occurs at "Colombo, in cinnamon gardens, local, rare" (*Hutchison*), and at "Hambantotte, June, among bushes, common" (*Wade*). Mr. G. F. Hampson says that it is "found rarely on the plains at the foot of the Nilgiri Hills." Mr. W. Doherty informs me that he has taken it at Muscat in Arabia.

The figure shows both sides of a male example from Bangalore in my collection.

Genus 113.—ORTHOMIELLA, nov. (PLATE XXVI).

FOREWING, *costa* evenly and gently curved throughout, *apex* rather acute, *outer margin* convex, *inner* margin rather sinuous, *inner angle* acute, produced; *costal nervure* ending opposite the apex of the discoidal cell; *first subcostal nervule* completely anastomosed with the costal nervure, into which it runs immediately after its origin, the costal nervure being bent downwards to meet it, again becoming free and reaching the margin some distance beyond the apex of the cell; *second* subcostal with its base nearer to the base of the first subcostal than to the base of the upper discoidal; *third* subcostal originating midway between the apices of the cell and the wing; *middle disco-cellular* nervule slightly outwardly oblique, concave; *lower* disco-cellular of the same length as the middle disco-cellular, slightly inwardly oblique, concave; *second median* nervule originating some little distance

before the lower end of the discoidal cell; *submedian nervure* following the inner margin, slightly bent downwards towards its extremity. HINDWING, *costa* arched at base, then slightly concave to apex, *apex* acute, *outer margin* at first straight, then convex; *anal angle* rounded; *costal nervure* very long, sinuous, following the outline of the wing, ending on the margin at the apex of the wing; *first subcostal nervule* originating some distance before the apex of the discoidal cell; *disco-cellular* nervules nearly erect, concave; *second median* nervule originating immediately before the lower end of the cell; *submedian* and *internal nervures* straight. *Antennæ* short, less than half the length of the costa of the forewing, with a large flattened spatulate club. *Palpi* long, porrect, second joint furnished with very long bristly hairs beneath, third joint naked, acicular. *Eyes* hairy. *Head* with a tuft of long hairs between the bases of the antennæ. Male with no secondary sexual characters. Female with the outer margin of the forewing more convex than in the male, otherwise similar. Type, *Chilades ? pontis*, Elwes.

Orthomiella belongs to the group of genera (*Azanus*, Moore, *Everes*, Hübner, *Talicada*, Moore, and *Nacaduba*, Moore) which have the first subcostal nervule of the forewing for some distance anastomosed completely with the costal nervure, then again becoming free and reaching the margin. It is perhaps nearest to *Azanus*, as that genus, like *Orthomiella*, has no tail to the hindwing. The outline of the hindwing in *Orthomiella* is however quite unique amongst Indian *Lycænidæ*; the costa instead of being slightly convex is slightly concave, and the apex instead of being rounded is acute, reminding one very much of the outline of *Argynnis pales*, Wiener Verzeichniss, and its Indian local race *A. sipora*, Moore; only in those butterflies the costa of the hindwing is gently convex, while in *Orthomiella* it is slightly concave. The spatulate club to the antennæ in the type species of *Orthomiella* is larger than in any other Indian species of *Lycænidæ*. The genus contains two species only. *O. pontis*, Elwes, is known from Sikkim only, and *O. sinensis*, Elwes, which I have not seen, is described from China. The former is deep shining purple, of the same shade as in *Nacaduba ardates*, Moore, and allies on the upperside in the male; the female is rich bright steel-blue, the colour more restricted to the middle of the wings than in the male. The underside of both sexes is marked somewhat similarly to the dry-season form of *Chilades laius*, Cramer.

710. **Orthomiella pontis**, Elwes. (PLATE XXVI, FIG. 177 ♂).

Chilades ? pontis, Elwes, Proc. Zool. Soc. Lond., 1887, p. 446; idem, id., Trans. Ent. Soc. Lond., 1888, p. 384, n. 259, pl. viii, fig. 5, *male*.

HABITAT: Sikkim.

EXPANSE: ♂, ·9 inch (*Elwes*); my specimens are ♂, 1·1; ♀, 1·0 to 1·15 inches.

DESCRIPTION: "MALE. UPPERSIDE, *both wings* dull purplish-black with faint green or (in some lights) purple reflection, darker towards the body. *Cilia* alternated with black and white. UNDERSIDE, *both wings* dull grey, with irregular darker markings, which on the *hindwing* coalesce into a blackish patch, powdered with grey on the inner half of the wing. *Body*, black, with grey hairs. *Palpi* grey. *Antennæ* faintly ringed, with a short distinct club." FEMALE. UPPERSIDE, *both wings* rich shining steel blue. *Forewing* with the costa narrowly the outer margin broadly and evenly black. *Hindwing* with costa and outer margin broadly black, abdominal margin broadly pale. UNDERSIDE, *both wings* as in the male. The shape of the wings is nearly the same in both sexes.

"The shape of the hindwing is very peculiar, the costal margin, which is straight, forming almost a right angle with the outer margin. I know of no other species in which the character is so well-marked. Described from three males (a fourth exists in Godman's collection ex coll. Lidderdale) taken by me on May 27th, 1886, on the bridge crossing the Rangbi river on the way from Darjiling to Mongpo, at about 6,000 feet elevation, in dense dripping evergreen-forest. This curious little insect is unlike anything found in India on the Himalayas, but has a very near ally in China, *C. sinensis*, Elwes." (*Elwes*. l. c.)

In Mr. Otto Möller's collection are about a dozen males taken in Sikkim of this very distinct and pretty little butterfly, and Mr. A. V. Knyvett has taken three females. On the

upperside the male is deep glossy shining purple, the outer margins of both wings narrowly black; the costal margin of the hindwing, bounded posteriorly and sharply by the subcostal nervure and its second branch, also black. On the underside the forewing has a dark brown spot across the middle of the cell, outwardly defined with whitish, a round spot below this one exactly posterior to the base of the first median nervule, a large spot closing the cell, with two below it and in the same straight line, divided by the first median nervule, and a discal series of four conjoined spots, some indistinct marginal lunular markings; the disc of the wing is suffused with pale ferruginous. The markings of the hindwing are difficult to trace, as those on the disc are all run together into a large brownish-fuscous patch, leaving a single large round spot on the costa near its middle alone free; the marginal markings are more prominent than in the forewing.

The figure shews both sides of a male specimen from Sikkim in my collection taken early in May.

I am rather doubtful about the propriety of the position in the order of the genera of the *Lycænidæ* that I have assigned to the two genera which follow. They agree with the genera which immediately precede them in not possessing a somewhat long filiform tail from the termination of the first median nervule of the hindwing, which is characteristic of the next group of "Blues." They however disagree from both the tailed and tailless "Blues" in the robustness of their structure and in the swiftness of their flight, in these respects agreeing much better with the "Hairstreaks." In the structure of the veins these two genera present no peculiarities whatever, nor have they any secondary sexual characters on the wings of the male. The first genus, *Lycænesthes*, Moore, however, is unique amongst Indian *Lycænidæ* in possessing two or three elongated tufts of cilia towards the anal angle of the hindwing, which, owing to their extreme delicacy, are very liable to be destroyed. This genus appears to be well represented in Africa. A few species occur in tropical India and from Malayana to Northern Australia. The transformations of one species of this genus are known. The other genus, *Niphanda*, Moore, is probably much more restricted in its range, and is much smaller in the number of species it contains, two only having with certainty been placed in it. One occurs only in Sikkim, the other only in the Malay Peninsula. Very little is known about either, and their transformations have yet to be discovered.

Genus 114.—LYCÆNESTHES, Moore. (PLATE XXVI).

Lycænesthes, Moore, Proc. Zool Soc. Lond., 1865, p. 773; id., Hewitson, Trans. Ent. Soc. Lond, 1874, p. 343; idem, id., Lep. Cey., vol. i, p. 87 (1881); id., Distant, Rhop. Malay., p. 232 (1884); id., Trimen, South-Afr Butt., vol. ii, p. 93 (1887).

"WINGS, moderately broad. FOREWING, with the *costal margin* arched at the base, *apex* rather acute, *outer margin* slightly oblique; *subcostal nervure* with its first branch arising at one-third the length of the wing, second and third equi-distant, fourth remote, fifth joined at the base to the third. HINDWING, rounded exteriorly, two small very fine tail-like fascicles of hair near the anal angle. *Eyes* hairy; *palpi* long, compressed, porrect, third joint long, attenuated, half the length of the second; *antennæ* slender at the base, thickened near the end, which is finely pointed; *legs* moderate, femora slightly pilose beneath, mid and hind tibiæ with two short apical spurs; *thorax* and *abdomen* robust." (*Moore*, l. c. in Proc. Zool. Soc. Lond.)

In the type species in the forewing the costal nervure terminates about opposite to the apex of the discoidal cell, the bases of the first and second subcostal and upper discoidal nervules are about equi-distant, the third subcostal nervule is long, given off from the subcostal nervure nearer to the apex of the cell than of the wing; middle disco-cellular nervule shorter than the lower, slightly outwardly oblique; lower disco-cellular straight, upright; second median nervule given off some little distance before the lower end of the cell. In the hindwing the upper disco-cellular nervule is recurved, outwardly oblique; the lower is straight, upright; the second median nervule given off nearer to the lower end of the cell than it is in the forewing.

The venation of this genus is most ordinary; it does not present a single peculiarity, nor has the male any secondary sexual characters. *Lycænesthes* differs, however, from all other

Indian genera in having three very fine ciliated tails to the hindwing. These tails are very short, the one from the termination of the first median nervule rather longer than the ones on each side of it, and they are composed of a slight bundle or fascicle of long hair-like scales, or cilia, which are very easily broken off; in most cabinet specimens they have entirely disappeared. In the males the coloration of the upperside is shining purple with a very narrow outer black margin; on the underside they are pale brown, marked very similarly to *Nacaduba*, *Jamides*, and allied genera; there is a white line on either side of the disco-cellular nervules, a catenulated discal band, two more or less distinct whitish marginal fasciæ, with, in the hindwing, some additional basal bands, often a black spot on the costa near the base, one on the middle of the abdominal margin, and a third near the margin in the first median interspace crowned with orange. The females are dull black on the upperside, with the base of the wings more or less blue, and a submarginal series of black spots to the hindwing.

As far as I am able to judge, the genus *Lycænesthes* contains but two good species occurring in India,—*L. emolus*, Godart, which has an immense range, occurring in north-eastern India, thence southwards to Orissa and Ganjam, in the Andaman Isles, from Assam through Burma to the Malay Peninsula, in Borneo and Amboina, and doubtless many other islands in the Malay Archipelago, and again in Northern Australia. The second species, *L. lycænina*, Felder, has, so far as is known, a more restricted range. It also occurs in many parts of India, in Ceylon, Assam, the Malay Peninsula, and in Borneo. These two species can be distinguished in the males by their different outline, *L. emolus* being a much more rounded insect than *L. lycænina*; the latter has the apex of the forewing, and especially the anal angle of the hindwing, much more acute than the former; the hindwing is also narrower, the outer margin less rounded, more oblique. The markings of the underside in *L. lycænina* are usually more prominent, and the tails more conspicuous, but these are not reliable guides for specific discrimination, though one has to rely on them to distinguish the females; as far as I know there is no other distinctive character, except the presence of the subbasal costal spot on the underside of the hindwing in *L. lycænina*, which may however occasionally be absent, as it always is in *L. emolus*. Of the other described species, *L. lycambes*, Hewitson, from "North India" is almost certainly synonymous with *L. lycænina*; and *L. orissica*, Moore, is nothing but an occasional variation of the same species. Mr. Hewitson enumerates as many as twenty-nine species as belonging to this genus, mostly from Africa, but a few from the Malay Archipelago. Mr. Trimen gives six species as occurring in South Africa (South-African Butterflies, vol. ii, p. 93). The Indian species have a very quick flight, settling frequently on the leaves of trees and bushes; the males are fond of sucking up moisture in damp places.

An account of the transformation of *L. emolus*, Godart, will be found under the description of that species.

Key to the Indian species of Lycænesthes.

A. Male with apex of forewing and anal angle of hindwing rounded.
  711. L. EMOLUS, India, Andamans, Assam, Burma, Malay Peninsula, Borneo, Amboina, North Australia.

B. Male with apex of forewing and anal angle of hindwing acute.
  712. L. LYCÆNINA, India, Ceylon, Assam, Malay Peninsula, Borneo.
  713. L. LYCAMBES, North India.

711. Lycænesthes emolus, Godart.

Polyommatus emolus, Godart, Enc. Méth., vol. ix, p. 656, n. 133 (1823); *Lycæna emolus*, *nec* Gerstaecker, Decken's Reisen, vol. iii, pt. 2, p. 373, n. 26, pl. xv, fig. 4 (1873), *nec* Trimen, Rhop. Afr. Austr., pt. ii, p. 234, n. 136, pl iv, figs. 8, 9 (1866); *Lampides balliston*, Hübner, Zutr. Ex. Schmett., figs. 229, 230, *male* (1823); *Lycænesthes balliston*, Semper, Journ. Mus. Godef., vol. xiv, p. 165, n. 87 (1879); *Dipsas lycænoides*, Felder, Sitzb. Ak. Wiss. Wein, Math.-Nat. Cl., vol. xl, p. 454, n. 21 (1860); ? *Pseudodipsas lycænoides*, id., Reise Novara, Lep., vol ii, p. 258, n. 305, pl. xxx, fig. 25, *male* (1865); ? *Lycænesthes lycænoides*, Hewitson, Ill. Diurn. Lep., p. 219, n. 1, pl. xcii, fig. 39, *female* (1878); *L. bengalensis*, Moore, Proc Zool. Soc. Lond., 1865, p. 773, pl xli, fig. 9, *male*; id., Distant, Rhop. Malay., p. 458, n. 2, pl. xliv, fig. 9, *male* (1886).

Habitat: Bengal (*Godart* and *Moore*); Cape York, Australia (*Semper*); Amboina (*Felder*); Malacca (*Distant*); Borneo (*Druce*); Eastern India, Orissa, Ganjam, Sikkim, Assam, Burma, Andaman Isles, Singapore.

Expanse: ♂, 1·00 to 1·40; ♀, 1·10 to 1·45 inches.

Description. "Male. Upperside, *both wings* dark purple-blue, exterior margins defined by a narrow suffused black line. *Hindwing* with a small indistinct black spot at anal angle, abdominal margin brown. Underside, *both wings* pale greyish-brown. *Forewing* with a short transverse double white line at the extremity of the cell, enclosing the discal veinlet [discocellular nervules], beyond which are a transverse discal chain-like white band and an outer indistinct brownish submarginal and a narrow white marginal line. *Hindwing* with basal, discoidal, and a curved discal series of chain-like white bands; an indistinct, inwardly angled, double-lunulated, white marginal line; a black spot bordered above with orange-red near the anal angle of the exterior margin, a small white-encircled black spot on middle of abdominal margin. *Head* above brown; *eyes* encircled with white; *palpi* above and beneath brown, at the sides white; *thorax*, *body*, and *legs* beneath white. Female. Upperside, *both wings* pale purple-brown, with a suffused bluish patch at the base; exterior margins suffused with darker brown. *Hindwing* with an inner narrow white exterior marginal line. Underside, *both wings* as in the male." (*Moore*, l. c. in Proc. Zool. Soc. Lond., 1865.)

Larva when full-fed ·62 of an inch in length, somewhat dark green in colour (of a darker shade than most lycænid larvæ), smooth and shining, the whole upper surface covered with minute pits to be seen only under a strong magnifying glass. The head is very small and retractile as usual, and of a pale green colour, the second segment is unmarked, the third to sixth segments inclusive have some obscure reddish-brown dorsal blotches, the three following segments are unmarked, the tenth to twelfth segments have somewhat similar blotches to those on the third to sixth segments, but they are more distinct and darker in shade. There is a pale yellow lateral line just above the legs. All the segments are irregularly and broadly pitted at the sides; these pits seem more or less to assume the form of a longitudinal subdorsal depression, below which to the lateral line the colour of the insect is slightly paler. The whole larva is much depressed, somewhat wider than high, and seems to gradually increase in breadth to the tenth segment, the last segment is almost as broad and rounded. The larva varies greatly in colour and markings, some being pale green throughout and unmarked, others again are reddish-brown throughout. It feeds, in Calcutta, on *Nephelium Litchi*, Lamb., *Cassia fistula*, Linnæus, and *Heynea trijuga*, Roxb., and not improbably, as it feeds on so many bushes, it will eat others. Dr. Forel identifies the ant which attends the larva as *Œcophylla smaragdina*, Fabricius, the large red and green ant which makes immense nests of growing leaves in trees. *Pupa* ·4 of an inch in length, of the usual lycænid shape, the tail pointed, the thorax slightly humped, and ending in a somewhat sharp ridge-line on the back; it is coloured pale ochreous, and bears a prominent diamond-shaped mark posteriorly. It is smooth throughout, reddish-brown, sprinkled with minute darker dots.

The correct identification of this species has long puzzled entomologists. In 1866 Mr. Trimen doubtfully identified Godart's *Polyommatus emolus* with a South African species of *Lycænesthes* (Rhop. Afr. Aust., p. 234, n. 136); the latter species however in 1887 he doubtless correctly states to be the *Lycænesthes liodes* of Hewitson (South-Afr. Butt., vol. ii, p. 100, n. 170), and states that *L. bengalensis*, Moore, "is almost certainly the same as Godart's species." In 1878 Mr. W. F. Kirby remarks: "I think it probable that this species [*lycænoides*, Felder, =*bengalensis*, Moore] is the true *Polyommatus emolus*, described by Godart as from Bengal." (Ill. Diurn. Lep., p. 219, n. 1) Mr. Semper in 1879 adds to the synonymy by stating that the *balliston* of Hübner is almost certainly the *bengalensis* of Moore (Journ. des Mus. Godef., vol. xiv, p. 165, n. 87). Lastly, in 1878, Mr. Hewitson gives the *lycænoides* of Felder as the same as *bengalensis* (Ill. Diurn. Lep., p. 219, n. 1), but Mr. Trimen states that, "judging from Felder's figure of the underside, and his description of the male, and Hewitson's figure of the female, I consider it very doubtful whether *lycænoides* can be held synonymous with Moore's

butterfly." I have previously (*antea*, p. 47) expressed a doubt as to *Dipsas lycænoides*, Felder, being synonymous with the species now being dealt with, but am unable to definitely settle the matter in the absence of specimens of the species from Amboina. I am quite satisfied however that *emolus* equals *balliston* and *bengalensis*.

L. emolus is a fairly constant species ; the chief variation appears to be in the intensity of the markings of the underside. Its distribution is a little peculiar ; it is common in Bengal and the north-eastern coast, but does not appear to occur at all in the Bombay Presidency or on the western coast, and is absent from South India and Ceylon. It is common throughout Assam and Burma, and occurs in the Andaman Isles, in the Malay peninsula and islands, and in North Australia.

712. **Lycænesthes lycænina**, Felder. PLATE (XXVI, FIG. 178 ♂).

L. lycænina, Felder, Verh. zool.-bot. Gesellscb Wien, vol. xviii, p. 281 (1868) ; id., Hewitson, Ill. Diurn. Lep., p. 219, n. 2, pl. xc, figs. 6, 9, *female* (1878) ; id., Moore, Lep. Cey., vol., i, p. 87, pl xxxv, figs. 8, 8*a*, *male* (1881) ; id., Distant, Rhop. Malay., p. 232, n. 1, pl. xxi, fig. 3, *male* (1884) ; *L. orissica*, Moore, Journ. A. S. B., vol. liii, pt. 2, p. 23 (1884).

HABITAT : Bengal, Sikkim, Assam, Burma, Malay Peninsula, Orissa, South India, Ceylon, Borneo.

EXPANSE : ♂, 1·0 to 1·3 ; ♀, 1·1 to 1·2 inches.

DESCRIPTION : " MALE. Nearest to *L. lycænoides*, Felder [from Amboina, ?=*L. emolus*, Godart], but smaller. UPPERSIDE, *both wings* a little more vivid in colour. *Hindwing* outwardly well-rounded, less dentate. UNDERSIDE, *both wings* palely hoary-fuscous. *Forewing* beyond the middle with a bifurcated catenular fascia, filled up with powdering of the ground-colour, and another submarginal of fuscescent spots circled with whitish (the upper ones inwardly subsagittate), some obsolete whitish spots arranged in a striga before the margin. *Hindwing* powdered with bluish-grey at the base, an ocellated antico-basal spot, and another internal, blackish circled with whitish, a postico-basal fasciole composed of two spots, and another disco-cellular of the same number of spots, contiguous to a third situated beyond the middle twice slightly broken, and catenular border spots two-fold connate, inwardly more or less sagittate, of the same colour, those of the forewing concolorous, of which the marginal situated between the first and second median nervules bearing a small black spot, inwardly narrowly circled with rufescent-fulvous." (*Felder*, l. c.) FEMALE. UPPERSIDE, *both wings* dull blackish, the basal areas more or less sprinkled with blue scales. *Hindwing* with a submarginal series of oval black spots placed between the veins, inwardly defined by a fine white line, that in the first median interspace the most prominent, often with a series of white lunules above them. *Cilia* white. UNDERSIDE, *both wings* as in the male.

L. lycænina may be usually known from *L. emolus* in the male by its brighter and lighter purple coloration on the upperside ; the apex of the forewing is more acute, the outer margin straighter ; in the hindwing the outer margin seems to be truncated, the anal angle very acute instead of being rounded. On the underside the markings are usually more prominent, the discal band in both sexes on both wings is more or less broken in the middle, very markedly so in the hindwing, while in *L. emolus* it is continuous. In *L. lycænina* there is almost always a prominent black spot near the base of the hindwing below and touching the costal nervure which is never present in *L. emolus* ; this spot is often small and inconspicuous, sometimes absent altogether ; similarly also the subanal black spot is sometimes entirely absent ; this latter variation has been described as a distinct species as below by Mr. Moore.* *L. lycænina* has almost

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* *Lycænesthes orissica*, Moore, Journ. A. S. B, vol. liii, pt. 2, p. 23 (1884). HABITAT : Orissa. EXPANSE : *Male*, ·9 of an inch. DESCRIPTION : " MALE, smaller than *L. lycænina*, Felder, and *L. lycambes*, Hewitson. UPPERSIDE, *both wings* of a similar purpurascent blue UNDERSIDE, *both wings* pale purpurascent greyish-brown, markings similar, but more regularly disposed. *Hindwing* has the subbasal costal black spot prominent, but the subbasal [subanal] black spot—so conspicuous in the above species—is absent, the entire exterior margin being uniformly marked." (*Moore*, l. c.)

I possess five males and two females of what I call *L. lycænina*, Felder, from Orissa, which includes the type specimen of *L. orissica*. They vary considerably in size ; some are as large as typical *L. lycænina* ; the markings on the underside are not always more regular than in typical *L. lycænina* ; the subbasal costal spot on the underside of the hindwing is entirely absent in one specimen, very prominent in one, small in the

as wide a distribution as *L. emolus*, but whereas the latter occurs in the Andaman Isles and not in South India and Ceylon, the former occurs in South India and Ceylon and not in the Andamans. Otherwise their distribution is much the same in India. The type specimen was taken at Avisavelle in Ceylon, Hutchison records it from "Pusalawe, hills about 3,000 feet, forests, September," and Wade from Kandy. I give below as a foot note* Mr. Distant's very full description of the male of this species, as Felder's description is not very easy to follow, although there is no doubt that it refers to this species, as it is the only one of the genus that occurs in that island.

The figure shows both sides of a male specimen from the Shevaroy Hills in my collection.

713. Lyænesthes lycambes, Hewitson.

L. lycambes, Hewitson, Ill. Diurn. Lep., p. 220, n. 3, pl. xc, figs. 11, 12, *male* (1878).

HABITAT: North India (*Hewitson*).

EXPANSE: ♂, 1·15 inches.

DESCRIPTION: MALE. "UPPERSIDE, *both wings* dull lilac-blue, the outer margins very narrowly bordered with brown. UNDERSIDE, *both wings* pale brown (stone-colour). *Forewing* with a spot at the end of the cell, and crossed beyond the middle by a broken band bordered on both sides with white, and by a double submarginal series of lunular white spots. *Hindwing* with numerous irregular linear white spots; the usual black spot crowned with orange." (*Hewitson*, l. c.)

Without consulting the type specimen it is impossible to say what this species is. As figured it agrees in shape with *L. lycænina*. Felder, and is probably conspecific with it. It is not at all unlikely that Hewitson considered *L. lycænina* to be confined to Ceylon, and described one of its numerous varietal forms from North India as a distinct species.

Genus 115.—NIPHANDA, Moore. (FRONTISPIECE).

Niphanda, Moore, Proc. Zool. Soc. Lond., 1874, p. 572.

FEMALE. "WINGS, broad, strong. FOREWING, elongated, trigonal; *costa* arched; *hind margin* extending much beyond hindwing; *exterior* margin slightly convex towards posterior angle; *posterior angle* acute; *median* [*subcostal*] *nervure* with four branches, the second and fourth arising at the extremity of the cell, the third starting from the second near its extremity before the apex. HINDWING, arched along anterior margin; *outer angle* much rounded; *abdominal margin* long and nearly straight, *anal angle* acute. *Palpi* very long, porrect, extending much beyond the head, flattened; second joint fusiform, squamose; third joint slender, naked, slightly thickened vertically at the tip. *Antennæ*" short in the female, less than half the length of the costa of the forewing; long in the male, nearly two-thirds the length of the costa, with a very long, slender, gradually-formed club. "BODY robust. LEGS slender, minutely squamose. Near to *Chrysophanus*," Hübner. (*Moore*, l. c.) MALE. FORE-

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rest; and the subanal black spot is entirely absent in the type specimen only, but it is small in three of the others, large in the rest. It will thus be seen how variable is this species in a single locality, and that it is not advisable to describe a supposed distinct species from a single specimen of an obviously variable species without first consulting a considerable series to make sure that its supposed specific differences are not individual differences only.

* "MALE. UPPERSIDE, *both wings* lavender-blue, the margins narrowly fuscous. UNDERSIDE, *both wings* greyish-brown, crossed by the following pale greyish linear fasciæ:—*forewing* with two disco-cellular at the end of the cell, followed by two also terminating at the third median nervule, two extending from near the base of the third median nervule to the submedian nervure, a single one between the third and second median nervules, and two somewhat waved submarginal: *hindwing* with about eight arranged in pairs, the basal pair not extending above the middle of the cell, the two following from near the base of the second subcostal nervule to near the abdominal margin, the third pair very short, and bounded by the costal nervure and the second subcostal nervule, and the fourth pair situated between the second subcostal nervule and the second median nervule, and two much angulated submarginal fasciæ; a small brown spot margined with greyish beneath and at a short distance from the base of the costal nervure, and a similar spot near the base of the abdominal margin, a black submarginal spot with a few bluish scales and inwardly margined with ochraceous situated between the second and first median nervules, and a narrow transverse dark streak at the anal angle. *Body* both above and beneath more or less concolorous with the wings."

"Although I have somewhat minutely described the arrangement of the greyish linear fasciæ of the underside of the hindwing belonging to a male specimen, such description must not be taken to imply that these markings are of a constant and invariable character, as in the small series now before me there is a slight but unmistakable divergence in that respect." (*Distant*, l. c.)

WING. more triangular than in the female; *costa* almost straight; *outer margin* much less convex; *anal angle* more acute. Both sexes with the *costal nervure* ending opposite the apex of the discoidal cell; *first subcostal nervule* emitted at about one-third from before the apex of the discoidal cell, slightly bowed upwards towards the costal nervure not far from its origin; *second* subcostal emitted about midway between the bases of the first subcostal and of the upper discoidal; *third* subcostal emitted midway between apices of cell and wing; no *upper disco-cellular* nervule; *middle* disco-cellular from upper discoidal, in a straight line with the lower disco-cellular, and of equal length, upright; *lower discoidal* nervule from their middle; *second median* nervule emitted some little distance before the lower end of the cell. HINDWING, *outer margin* in the male between the terminations of the costal nervure and second subcostal nervule straight, outwardly oblique; from the termination of the second subcostal nervule to the anal angle (which is very acute) also straight but inwardly oblique; *second* and *third median nervules* emitted from the end of the cell. These characters are taken from *N. cymbia*, de Nicéville, the only species I have seen. Mr. Moore's description of the subcostal nervules of the forewing is quite incomprehensible to me.

Mr. Distant (Rhop. Malay., p. 459) does not appear to think that *Niphanda* is a good genus, as he places the type species, *N. tessellata*, Moore, in the genus *Lycænesthes*, Moore. In neuration the points of difference between *Lycænesthes emolus*, Godart (= *baliston*, Hübner, and *bengalensis*, Moore), which is the type of the genus, and *Niphanda cymbia*, de Nicéville, are but slight. In both sexes of *N. cymbia* the first subcostal nervule of the forewing is more bent up towards the costal nervure than in *L. emolus*; the disco-cellular nervules in *N. cymbia* are perpendicular, in *L. emolus* they meet outwardly at an angle; in the hindwing in *N. cymbia* the disco-cellular nervules are straight and in almost the same straight line, in *L. emolus* they are both concave, and their general direction is outwardly oblique. The chief point of difference between the two genera is, in my opinion, the presence of three fine ciliated tails to the hindwing in *Lycænesthes*, which appear to be entirely absent in *Niphanda*. As far as is known at present, *Niphanda* contains but two species—*N. cymbia* which occurs in Sikkim, and *N. tessellata* at Penang. A third species, *Niphanda fusca*, Bremer and Grey, has been recorded from Amurland, China and Japan, by Mr. J. H Elwes,* and from Japan, Yesso and Corea by Mr. J. H. Leech,† but I quite agree with the former writer that in form and coloration it does not seem to very closely resemble the other described species of the genus, though it may belong to it.

714. **Niphanda cymbia**, de N. (FRONTISPIECE, FIGS. 130 ♂, 131 ♀).

N.? cymbia, de Nicéville, Journ. A. S. B., vol. lii, pt. 2, p. 76, n. 16, pl. ix, figs. 8, *male*; 8*a*, *female* (1883); *N. cymbia*, Staudinger, Ex. Schmett., p. 270, pl. xciv, *male* (1888); *N. plinioides*, Moore, Proc. Zool. Soc. Lond., 1883, p 524, pl. xlviii, fig. 8, *female*; *N. tesselata*, de Nicéville, (*nec* Moore), Journ A. S. B., vol. li, pt. 2, p. 61, n. 168 (1882).

HABITAT: Sikkim.

EXPANSE: ♂, 1·05 to 1·15; ♀, 1·15 to 1·40 inches.

DESCRIPTION: "MALE. UPPERSIDE, *forewing* shining violet; the costa, outer margin, a disco-cellular streak and the veins black. *Hindwing* also violet, with the costal, outer and abdominal margins black, this black border ascending in two conical-shaped spots between the median nervules. UNDERSIDE, *both wings* sullied white, the markings fuliginous. *Forewing* with a basal streak, an increasing band from the subcostal nervure to the inner margin crossing the middle of the cell, an oval spot closing the cell, a discal series of six quadrate spots broken at the second median nervule, the two lower ones nearer the base of the wing, a patch beyond the four upper spots, wide on the costa, decreasing to the fourth spot, where it ends in a fine point, a submarginal irregular line and marginal spots, the two spots between the median nervules the largest and most prominent, a fine anteciliary black line. *Hindwing* with a spot at the base, three spots beyond, the one on the costa the largest and darkest; a double spot closing the cell, with two spots above it, the upper one very large, oval and black; a very irregular discal series,

* Proc. Zool. Soc. Lond., 1881, p. 883.

† Proc. Zool. Soc. Lond., 1887, p. 410, n. 31.

marginal markings as on the forewing. *Cilia* fuliginous on both sides of both wings. very long at the anal angle of the hindwing. *Antennæ* black, with the slender club tipped with white above, the shaft obscurely annulated with white below. *Body* black above, whitish below, the segments laterally marked with whitish. FEMALE. UPPERSIDE, *both wings* fuliginous-grey, paler on the disc. *Forewing* with the disco-cellular and discal spots of the underside showing through. *Hindwing* with a submarginal series of pale spots, then a dark band, and finally a series of black roundish spots increasing to the fourth which is the largest, the two anal ones small and linear, all outwardly defined with a fine grey line. UNDERSIDE, *both wings* with the ground-colour much paler than in the male, being almost white, all the markings larger and more prominent "

" A fairly common species in the low valleys below Darjiling; the females largely predominating in numbers, however, over the males." (*de Nicéville*, l. c.) It occurs in Sikkim in October and November, probably at other seasons.

Mr. Otto Möller possesses a curious aberration of a female of this species, which has the forewing on the upperside white, tinted with blue at the base; the costa, discoidal spot, submarginal and marginal bands dark brown; the hindwing is also abnormally pale, and sprinkled with blue scales at the base.

As Mr. Moore described this species, but under a different name, a short time after the publication of my description and name, I reprint his description as a foot note.* He appears to have described two female specimens as male and female.

The figures shew both sides of both sexes of specimens from Sikkim in my collection.

A species very closely allied to *N. cymbia* has been described from the Malay Peninsula as below.† The male of *N. tessellata* appears to differ from that sex of *N. cymbia* in being a

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* *Niphanda plinioides*, Moore, Proc Zool. Soc. Lond , 1883, p. 524, pl. xlviii, fig. 8, *female*. HABITAT: Sikkim. EXPANSE: *Male*, 1·2; *female*, 1·1 incbes. DESCRIPTION: " MALE and FEMALE. UPPERSIDE, *both wings* violaceous-brown, with a very faint shade of violet-blue in some lights. *Forewing* with the discal interspaces between the veins whitish-brown, palest in the male, and traversed by an indistinct darker transverse discal fascia; a marginal row of black spots *Hindwing* witb a marginal row of whitish-bordered black spots, of which tbe second and third from anal angle are the largest, and two parallel discal curved rows of small whitish spots. *Cilia* alternated with whitisb. UNDERSIDE, *both wings* dirty-wbite *Forewing* with a blackish-brown slender streak ascending half length of upper base of the cell, a curved streak from below its base to middle of tbe cell, and a lunular spot at its end; an interrupted discal macular band, the upper part with a broad outer fascia, and a submarginal and a marginal lunular band, tbe latter with two blackish spots on its middle. *Hindwing* witb a blackish-brown spot at base of the cell, three subbasal spots, one on middle of abdominal margin, and two large spots on costal border, a smaller spot below the outer one, and a streak at end of the cell, an irregular discal series with paler brown outer borders, and an outer marginal row bordered by a submarginal paler lunular band, the second and third from the anal angle the largest. Base of *palpi* white beneatb; *legs* white, with brown tarsal bands; *antennæ* annulated with white bands "

" Both sexes on the upperside have much the appearance of a dark female *Lycæna* [=*Tarucus*] *plinius*, Fabricius, and *L.* [=*T.*] *theophrastus*, Fabricius, but these insects are, structurally, quite distinct." (*Moore*, l. c.)

† *Niphanda tessellata*, Moore, Proc. Zool. Soc. Lond., 1874, p. 572, pl. lxvi, fig. 6, *female*; *Lycænesthes tessellata*, Distant, Rhop. Malay., p. 458, n 3. pl. xlii, fig. 13, *male*; pl. xliv, fig. 21, *female* (1886): *L. æthiops*, id., Ann. and Mag. of Nat. Hist., fifth series, vol. xvii, p. 253 (1886) HABITAT: Penang. EXPANSE: *Male*, 1 3; *female*, 1·5 inches. DESCRIPTION: " MALE. UPPERSIDE, *both wings* dark violaceous-blue. [*Forewing* with the costa and outer margin somewhat broadly fuscous. *Hindwing* with the abdominal margin somewhat broadly fuscous, some fuscous streaks on the disc, a marginal series of narrow black spots between the veins.] UNDERSIDE, *both wings* greyish mottled with purplish. *Forewing* with the following dark fuscous markings :—a broad basal streak beneath the costal nervure extending to about the middle of the cell, where it is joined to a large spot which crosses and extends beneath the cell; a large disco-cellular spot at the end of the cell; a curved fascia between the end of the cell and the outer margin, extending from the second subcostal nervule to the second median nervule; a somewhat similar fascia extending from tbe second median nervule near the end of the cell to near the inner margin; paler narrow marginal and submarginal fasciæ containing a large, round, dark spot between the second and first median nervules. *Hindwing* with the following dark markings :—four basal spots, two large spots beyond the cell divided by the upper subcostal nervule, a marginal series of smaller dark spots and paler discal spots, of which the most prominent are a transverse one at the end of the cell, and a transverse waved series of rounded ones; all these spots are margined witb greyish. *Body* and *legs* more or less concolorous witb the wings." (*Distant*, l. c. in Rbop. Malay.) FEMALE. " UPPERSIDE, *both wings* pale glossy blue. *Cilia* white, streaked witb brown. *Forewing* with a broad dusky black band along tbe costa and exterior margin; a patch below the apex, a disco-cellular spot, and a lower discal spot also black; a short white streak at the posterior angle. *Hindwing* broadly dusky black along anterior margin, the exterior margin with a series of black spots bordered witb bluish-white, and an inner dusky line. UNDERSIDE, *both wings* white. *Forewing* with an irregular basal patcb, a quadrate disco-cellular spot, and an interrupted transverse discal series of quadrate spots dark blackish-brown; a suffused streak along the costa, a streak bordering the upper portion of the discal spots, and a series of spots with inner bordered line on exterior margin pale brown, the penultimate posterior spot being large, prominent, and nearly black. *Hindwing* with irregular pale-bordered basal marks, a contiguous transverse series of four quadrate spots, two spots beyond on middle of anterior margin, and a series of spots on exterior margin blackish-brown, the basal and anal spots being most

paler shade of purple on the upperside; the female is suffused with blue towards the base of both wings on the upperside, which coloration *N. cymbia* entirely lacks in that sex.

I call the fourth division which I have made in the Indian *Lycænidæ* the *Polyommatus* group. It contains nine Indian genera, and completes the assemblage of the "Blues." All these genera are tailed except some species, or forms, or individuals of the genus *Nacaduba*, Moore, which are aberrant in this respect, having no tail to the hindwing; just as the genus *Megisba*, Moore, in the third group, possesses aberrant examples, which depart from the normal structure of the tailless blues in possessing a tail to the hindwing. None of these genera possess secondary sexual characters in the male.

The first subgroup contains three genera, all of which have the first subcostal nervule of the forewing completely anastomosed for a short distance with the costal nervure. As far as the structure of the veins goes, these three genera are practically the same, but they can be distinguished by their varied *facies*. The first genus, *Talicada*, Moore, contains but a single species, and might perhaps with advantage be sunk under the next genus, which also is a very small one, and has some species which agree with the solitary *Talicada* in possessing not a single speckle of blue on the wings. On the upperside of both sexes of *Talicada nyseus*, Guérin, the wings are black, the posterior half of the hindwing rich orange—a most extraordinary type of coloration for a butterfly of the family of the "Blues." It is a grass-loving, low-flying creature, with a restricted range, occurring only in Assam, Upper Burma. Orissa, the Western Ghâts, South India, and Ceylon. The next genus, *Everes*, Hübner, contains but few species, but one of them has an immense range, occurring all round the northern hemisphere. They vary most extraordinarily in size, are weak-flying, and inhabit the grass. The widely-spread species, *E. argiades*, Pallas, has the male blue on the upperside, the other two known Indian species have no blue whatever above. The last genus, *Nacaduba*, Moore, contains the greatest number of species of the three, and is fonnd throughout the Indo-Malayan region; one species has been recorded from Australia. It has a well marked *facies*, the males are always deep purple-blue on the upperside, both sexes with catenulated bands on the underside. It shares with *Megisba*, Moore, the peculiarity of containing tailed and tailless species; one species, indeed, appears to be dimorphic with regard to this character. As far as I am aware, all the species of the genus affect trees and bushes avoiding the ground, though the males are very fond of sucking up the moisture from damp spots.

Genus 116.—TALICADA, Moore. (Plate XXVI).

Talicada, Moore, Lep. Cey., vol. i, p 96 (1881).

"Forewing, *costa* arched at the base, *outer margin* obliquely convex, [*inner* margin sinuous]; *first subcostal nervule* emitted at one-half before the end of the discoidal cell, ascending to and anastomosing with the costal nervure to near its end; *second* subcostal at one-fifth, and *third* subcostal at one-sixth before the end of of the cell, *fourth* subcostal at beyond half from third and terminating at the apex; fifth subcostal [*upper discoidal*] from the end of the cell; *middle* and *lower disco-cellular* nervules slightly recurved, radial [*lower discoidal*] nervule from their middle; *discoidal cell* more than half the length of the wing, broad to near the base; *second median nervule* at one-sixth before the end of the cell, *first* median at one-half before the end; *submedian nervure* nearly straight. Hindwing, broadly oval, furnished with a single slender *tail* from the end of the first median nervule; *costal nervure* much arched from the base; *first subcostal nervule* at one-third before the end of the cell; *disco-cellular* nervules

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prominent; the basal interspaces, irregular streaks from abdominal margin, and lunules to exterior spots pale brown." (*Moore*, l. c.)

Mr. Distant has figured the male of this species with the two ciliated tails to the hindwing which are characteristic of the genus *Lycænesthes*. If this be correct—though I much doubt it—then *tessellata* should be placed in that genus, as Mr. Distant says. He figures the female, however, without tails, and seeing that the general *facies* of both sexes on both surfaces of *N. cymbia* and *N. tessellata* are almost precisely similar, I cannot believe that the Penang species possesses tails while the Sikkim one lacks them entirely. Mr. Distant remarks that "the peculiarity of *L.* [=*N.*] *tessellata* is in its Ethiopian appearance, its most closely allied species being found in the West African *N. larydas*, Cramer." I think that *L. cymbia* will be found to be even more closely allied.

slightly recurved, *discoidal* nervule from their middle ; *discoidal cell* not extending to half the wing ; *second median nervule* from near the end of the cell, *first* median at more than half before the end ; *submedian* and *internal nervures* straight. BODY, moderate ; *palpi* porrect, flattened, second joint laxly squamose beneath, third joint long, slender ; *legs* slender ; *antennæ* with the club stout. Allied to *Scolitantides*," Hübner,=*Lycæna*, Fabricius. "Type, *T. nyseus*, Guérin." (*Moore*, l. c.)

In the forewing the costal nervure terminates exactly opposite the apex of the cell, the first subcostal nervule anastomosing with it for some little distance, the second subcostal originates a little nearer to the base of the first than to the base of the upper discoidal nervule, third subcostal from midway between the base of the second subcostal and the apex of the wing, no upper disco-cellular nervule, the middle and lower disco-cellulars almost in one straight line and slightly outwardly oblique.

This remarkable genus contains but a single species, which is confined to Southern India, Ceylon, Assam, and Upper Burma. The sexes are alike ; they are black on the upperside, with a broad vermilion patch on the hindwing occupying the lower outer third of the wing ; the cilia prominently checkered. The underside is white, the forewing marked with several black bands and a prominent black spot at the end of the cell ; the hindwing with numerous large basal black spots, the outer margin from the anal angle to the second subcostal nervule vermilion, enclosing a series of rounded white spots ; above the second subcostal nervule to the apex the margin is black instead of vermilion. Where it occurs, I believe the species is common, but I have never seen it alive. The transformations are described under the species.

715. **Talicada nyseus**, Guérin. (PLATE XXVI, FIG. 179 ♀).

Polyommatus nyseus, Guérin, Dellessert's Souv. d'un Voy. dans l'Inde, p. 78, pl. xxii, figs. 1, 1*a* (1843) ; *Scolitantides nyseus*, Butler, Proc. Zool. Soc. Lond., 1881, p. 607, n. 23 ; *Talicada nyseus*, Moore, Lep. Cey., p. 97, pl. xxxix, figs. 1, 1*a*, *imago*; 1*b*, *larvæ* and *pupa* (1881) ; id., Swinhoe, Proc. Zool. Soc. Lond., 1885, p. 133, n. 64 ; *Lycæna nyseus*, Staudinger, Ex. Schmett., p. 271, pl. xciv, *female* (1888).

HABITAT : Assam, Upper Burma, Sind, Orissa, South India, Ceylon.

EXPANSE : ♂, ♀, 1·4 to 1·7 inches.

DESCRIPTION : MALE and FEMALE. "UPPERSIDE, *both wings* blackish violet-brown, *cilia* spotted with white. *Hindwing* with a broad scarlet band occupying the lower two-thirds of the outer area, [with a fine black anteciliary line]. UNDERSIDE, *both wings* white. *Forewing* with a broad black outer band, crossed by two submarginal series of white spots and a marginal lunular line ; a black spot at the end of the cell. *Hindwing* with a black basal spot, three subbasal, three medial, and in the female a more or less perfect discal series ; the apex of the wing also black ; lower outer margin broadly scarlet, traversed by a row of white spots and a marginal lunular line, bordered with black dentate marks. *Palpi* and *legs* black above, banded with white ; *antennæ* annulated with white." *Tail* black, tipped with white.

"LARVA onisciform, [hairy] ; pale olive-yellow, with a slender green dorsal line and a lateral row of black dots, [purplish along the spiracles]. Feeds on *Bryophyllum* (*Thwaites*). PUPA pale olive-yellow, dotted with black," the dorsal area tinted with purple ; the thorax humped, very hairy throughout. (*Moore*, l. c.) General Evezard informs me that the larva "feeds on the *Crassulaceæ* order of plants, such as *Bryophyllum*, *Calycinum* and *Kalanchöe laciniata*, these plants grow wild all over India."

"This peculiarly distributed insect [*T. nyseus*] is not found at all in Bombay, nor do I recollect once meeting with it at Khandalla, Matheran, or Egutpura; but in a particular spot at Mahableshwar it was swarming last March, and I have a faint recollection of its being equally abundant at the hill forts of Singhur and Poorundhur near Poona, while at Poona itself it is never wanting during the dry months. Mr. H. Wise informs me that in Kanara he finds it at an elevation of 1,500 feet. It lies very low and settles much on the ground ; wings always closed," (*Aitken*, Journ. Bombay Nat. Hist. Soc., vol. i, p. 218, n. 60 (1886). Colonel Swinhoe (l. c.) records it from "Poona, September to June ; Belgaum, September and October ; a very local insect." In Ceylon it occurs in the "Western and Central Provinces. Plains and nearly up to 4,000 feet ; generally on borders of cultivated ground, apparently all

the year round. Flight slow ; flits about low shrubs and settles on the ground" (*Hutchison*) ; "Kandy and Galle, common" (*Wade*). "Common on the Nilgiris, especially on the lower slopes" (*G. F. Hampson*). Mr. Butler records this species from Hydrabad, Sind, collected by Colonel Swinhoe. It is found in Orissa, Ganjam, Bangalore, the Pulni Hills, Calicut, the Wynaad, Rutnagherry, Canara, and Travancore, and doubtless throughout South India in suitable localities in addition to Assam and Upper Burma.

T. nyseus is a fairly constant species ; in some specimens the red patch on the upperside of the hindwing is broader than in others, and on the underside the black markings vary somewhat in size, and in the hindwing several of the black spots are often wanting in both sexes. Its isolated appearance in Upper Burma and Assam (Shillong, Manipur and the Naga Hills) appears to me to be not a little remarkable. It was first discovered in the Nilgiri hills.

The figure shews both sides of a female specimen in my collection captured at Shillong.

Genus 117.—EVERES, Hübner. (PLATE XXVI).

Everes, Hübner, Verz. bek. Schmett., p. 69 (1816) ; id., Moore, Lep. Cey., vol. i, p. 85 (1881) ; id., Distant, Rhop. Malay., p. 221 (1884) ; id., Scudder, Butt. East. United States and Canada, p. 905 (1889)

"FOREWING, elongate, triangular ; *costa* slightly arched at the base, *apex* rounded, *exterior margin* lightly oblique and convex, *posterior* margin long ; *costal nervure* short, bent slightly upwards before reaching the costa, and not extending to half length of the margin ; *first subcostal nervule* ascending and anastomosed to the costal nervure near its end ; *second* subcostal at one-third before the end of the cell ; *third* subcostal at one-sixth before its end ; *fourth* subcostal from one-half length of the third and terminating at the apex ; fifth subcostal [*upper discoidal*] from the end of the discoidal cell ; *disco-cellular* nervules slightly oblique ; radial [*lower discoidal*] nervule from their middle ; *second median* nervule emitted at one-sixth before the end of the cell, *first* median at one-half before its end ; *submedian nervure* slightly recurved. HINDWING, oval, with a slender *tail* from the end of the first median nervule ; *costal nervure* extending to near the apex, arched at the base ; *upper disco-cellular nervule* oblique, *lower* disco-cellular erect, *discoidal* nervule from their middle ; *discoidal cell* short ; *second median nervule* emitted before the end of the cell, *first* median at one-half before its end ; *submedian* and *internal nervures* straight. BODY small, short ; *palpi* slender, porrect, second joint pointed at its end and clothed with longish scales at its base beneath, third joint long, slender ; *legs* slender ; *antennæ* with a slender grooved club. Type, *E. amyntas*, Fabricius,"=*argiades*, Pallas. (*Moore*, l. c.)

In *Everes* the costal nervure, especially in the male, is very short, and anastomoses with the first subcostal nervule for some little distance ; the second subcostal is emitted rather nearer to the base of the first than to that of the upper discoidal nervule ; the third subcostal originates nearer to the base of the upper discoidal than to the apex of the wing ; there is no upper disco-cellular nervule, the middle disco-cellular is straight, outwardly oblique, the lower disco-cellular also straight, but inwardly oblique.

"LARVA (*E. argiades*, var. *coretas*, Ochsenheimer) pale green, with a darker dorsal stripe, dark lateral streaks, and light brown and white spots. Feeds on trefoil and other *Leguminosæ*. (*Lang*, Butt. of Eur., p. 102 (1884).

"LARVA elliptical in form, flatter and more elongated than in *Cyaniris*, Dalman, with a flatter terminal segment, of a greenish colour, with a dark dorsal stripe and many oblique lateral lines. They feed on a variety of *Leguminosæ* ; in Europe they have been found on *Lotus*, *Anthyllis*, *Medicago*, *Trifolium*, *Pisum*, and *Onobrychis*, and even on *Rhamnus* ; in North America it feeds on *Lespedeza*, *Phaseolus*, *Desmodium*, *Galactia*, *Trifolium*, and *Astragalus*. PUPA longer and slenderer than in *Cyaniris*, being nearly four times longer than broad, the abdomen but slightly more elevated than the thorax, and the whole body covered with long distant hairs by which they may readily be distinguished ; in colour they resemble the caterpillars, or are darker and spotted with black." (*Scudder*, l. c.)

This genus, as far as I know, contains but five distinct species, one of which, *E. exiguus*, Distant, was described from a single female example taken at Singapore ; another, *E. kala*,

de Nicéville, from another unique example taken near Shillong ; and a third, *E. umbriel*, Doherty, also from a unique male taken in Burma. Of the two remaining species, *E. fischeri*, Eversmann, occurs in S.-E. Russia, the Ural, the Altai Mountains, China, and Corea, and very closely resembles *E. kala* ; and *E. argiades*, Pallas, is violet-blue above in the male with an exterior black border, whitish cilia, and some marginal black spots to the hindwing. On the underside it is marked very much like the true *Lycænæ*, having a disco-cellular mark, a discal series of spots and marginal lunular fasciæ on both wings, as in the species of that genus. Its chief characteristic, however, is a submarginal orange fascia on the hindwing below ; this often is very much reduced, sometimes absent altogether. The marginal black spots of the hindwing are often spangled with metallic silvery scales. The female is frequently entirely smoky-black above, sometimes with much blue on the base and disc of the wings. According to my views, *E. argiades* occurs in North America, in Europe, almost throughout Asia, the Malay archipelago, and in Australia. It is probably the most widely-ranging species of the family.

Key to the Indian species of Everes.

A. Forewing, underside, with the discal series of spots arranged in a straight unbroken line.
 716. E. ARGIADES, North America, Europe, Asia, Australia.

B. Forewing, underside, with the discal series of spots arranged in a much curved line, all the spots large, deep black circled with a fine white line, and very prominent.
 717. E. KALA, Assam.

C. Forewing, underside, with the discal series of spots arranged in two straight lines or fasciæ, broken posterior to the second median nervule.
 718. E. UMBRIEL, Burma.

716. Everes argiades, Pallas. (PLATE XXVI, FIG. 180, ♂).

Papilio argiades, Pallas, Reise, vol. i, App., p. 472, n. 65 (1771) ; *Lycæna argiades*, Elwes, Proc. Zool. Soc. Lond., 1881, p. 887 ; id., Lang, Butt. of Eur., p. 101, n. 4, pl. xxii, figs. 5, *male* and *female* (1884) ; id., Leech, Proc. Zool. Soc. Lond., 1887, p. 415, n. 54 ; id., Pryer, Rhop. Nihonica, p. 17, n. 51, pl. 4, figs. 23A, *male* ; 23B, *female* (1888) ; *Papilio amyntas*, Fabricius, Syst. Ent., p. 533, n. 384 (1775) ; idem, id., Mant. Ins., vol. ii, p. 70, n. 666 (1787) ; id., Wiener Verzeichniss, p. 185, n. 18 (1776) ; id., Hübner, Eur. Schmett., vol. i, pl. lxv, figs. 322-324 (1798-1803) ; *Hesperia amyntas*, Fabricius, Ent. Syst., vol. iii, pt. 1, p. 285, n. 95 (1793) ; *Polyommatus amyntas*, Godart, Enc Méth., vol. ix, p. 659, n. 146 (1823) ; *Lampides amyntas*, Butler, Cat. Fab. Lep. B. M., p. 164, n. 10 (1869) ; *Papilio tiresias*, Rottenburg, Naturf., vol. vi, p. 23, n. 10 (1775) ; id., Esper, Schmett., vol. i, pt. 1, pl. xxxiv, figs. 1, 2 (1778 ?) ; pl. xlix, fig. 2 (1779) ; id., Hübner, Eur. Schmett., vol. i, figs. 319-321 (1798-1803) ; *Papilio polysperchon*, Bergstrasser, Nomencl., vol. ii, p. 72, pl. xliv, figs. 3-5 (1779) ; id., Ochsenheimer, Schmett. Eur., vol. i, pt. 2, p. 61 (1808) ; *Hesperia parrhasius*, Fabricius, Ent. Syst., vol. iii, pt. 1, p. 289, n. 108 (1793) ; *Papilio parrhasius*, Donovan, Ins. Ind., pl. xlv, fig. 5, *male* (1800) ; *Polyommatus parrhasius*, Godart, Enc. Méth., vol. ix, p. 657, n. 136 (1823) ; *Lycæna parrhasius*, Horsfield, Cat. Lep. E. I. Co., p. 86, n. 20 (1829) ; id., Horsfield and Moore, Cat. Lep. Mus. E. I. C., vol. i, p. 22, n. 11, pl. 1*a*, fig. 3, *male* (1857) ; *Lampides parrhasius*, Butler, Cat. Fab. Lep. B. M., p. 165, n. 12 (1869) ; id., Semper, Journ. des Mus. Godef., vol. xiv, p. 155, n. 53 (1879) ; *Cupido parrhasius*, Snellen, Tijd. voor Ent., vol. xxi, p. 19, n. 85 (1878) ; *Everes parrhasius*, Moore, Lep. Cey., vol. i, p. 85, pl. xxxvi, fig. 7 (1881) ; id., Distant, Rhop. Malay., p. 221, n. 1, woodcut n. 66, *male* (1884) ; ? *Papilio glandon*, de Prunner, Lep. Ped. (1798) ; *Cupido puer*, Schrank, Fauna Boica, vol. ii, pt. 1, p. 215, n. 1374 (1801), *male* only ; *Papilio alcetas*, Hübner, Eur. Schmett., vol. i, p. 51 (1805) ; *Papilio coretas*, Ochsenheimer, Schmett. Eur., vol. i, pt. 2, p. 60 (1808) ; *Polyommatus coretas*, Meigen, Eur. Schmett., vol. ii, p. 14, n. 18, pl. xliv, figs. 5*a*, *b* (1830) ; *Polyommatus comyntas*, Godart, Enc. Méth., vol. ix, p. 660, n. 147 (1823) ; *Argus comyntas*, Boisduval and Leconte, Lep. Am. Sept., p. 120, pl. xxxvi, figs. 6, 7, *male* ; 8, *larva* ; 9, *pupa* (1833) ; *Everes comyntas*, Scudder, Butt. East. United States, p. 911, pl. vi, fig. 9, *male* ; 10, *female* (1889) ; *Lycæna hellotia*, Ménétriés, Cat. Lep. Mus. Petr., vol. ii, pp. 84, 124, n. 1395, pl. x, fig. 6, *female* (1857) ; *Everes hellotia*, Butler, Ann. and Mag. of Nat. Hist., fifth series, vol. ix, p. 17, n. 17 (1882) ; *Lycæna praxiteles*, Felder, Verh. zool.-bot. Gesellsch. Wien, vol. xii, p. 489, n. 151 (1862) ; idem, id., Reise Novara, Lep., vol. ii, p. 281, n. 355, pl. xxxv, fig. 5, *male* (1865) ; *Lycæna dipora*, Moore, Proc. Zool. Soc. Lond., 1865, p 506, n. 108, pl. xxxi, fig. 8, *male* ; *Everes dipora*, Doherty, Journ. A. S. B., vol. lv, pt. 2, p. 132, n. 158 (1886).

HABITAT : North America, Central and Southern Europe (except Britain and Spain), North-Western Asia, the South of Siberia, the Amur, Japan, Corea, China, almost throughout India, Ceylon, Assam, Burma, the Malay Peninsula, Nicobar Isles, Sumatra, Java, Celebes, Sumba, Sambawa, Ceram, Philippines, Australia.

EXPANSE : ♂, ♀, ·75 to 1·50 inches.

DESCRIPTION: MALE. UPPERSIDE, *both wings* blue with an outer black margin of very variable width; sometimes with a black disco-cellular spot. *Cilia* whitish throughout. *Hindwing* with a more or less prominent marginal series of black spots, sometimes indistinctly crowned with orange; the wing outwardly bounded by a very fine white line and an anteciliary fine black line; tail very variable in length, tipped with white, the shaft more or less white. UNDERSIDE, *both wings* sometimes almost pure white, often more or less sullied with brownish. *Forewing* with a fine blackish line on the disco-cellular nervules, a discal series of spots, sometimes brownish and confluent into a macular band, sometimes well separated, distinct, black surrounded by a fine white line; two somewhat indistinct submarginal series of dark lunules, the inner series sometimes very prominent and formed into large quadrate spots; an anteciliary fine black line. *Hindwing* with the disco-cellular nervules defined by a narrow dark line; sometimes with four prominent black spots only, one beyond the middle of the costa, two near the base, and one near the middle of the abdominal margin, an obscure discal irregular series of pale brown spots, the marginal series of lunules as in the forewing, bearing two prominent black spots beyond the tail, irrorated with greenish-silvery scales and crowned broadly with orange; sometimes with the discal irregular series of spots as prominent and as black as the rest, with a complete marginal silver-spangled series of black spots, with a broad orange band placed inwardly against them; a fine anteciliary black line. FEMALE. UPPERSIDE, *both wings* sometimes entirely sooty black, sometimes with the basal and discal area of the forewing and the disc of the hindwing blue, sometimes the entire upper surface almost as blue as in the blackest-bordered males, but the blue of a different shade. *Hindwing* with the marginal black spots usually more prominent than in the male. UNDERSIDE, *both wings* as in the male.

The above description is drawn up from Indian specimens only. The variations indicated appear to be confined to no particular locality, though I believe there is a very marked seasonal dimorphism in many localities, the lightest-coloured males and females occurring in the dry-season, the dark males and completely black females in the rains. No author has placed the *parrhasius* of Fabricius and the *dipora* of Moore as synonyms of *argiades*, but no author has undertaken to show how these three species differ. I can find absolutely no character by which to separate them; in every direction the species is a most variable one, and these variations are not confined to any particular region or locality, though every variation could not perhaps be found in any one place. In Europe Dr. Lang says that *L. argiades* has "two or three broods in the year; the individuals of the spring brood are smaller than those which appear later in the season; and to these the name *polysperchon*, Bergsträsser, is generally given. Besides this seasonal variation, there is an aberration found at the same time and in the same localities as the typical form: this is the *coretas*, Ochsenheimer, which differs from the type in the absence of the orange spots on the underside." I have not seen any Indian specimens with no orange whatever below, though many have that colour quite obsolescent. Mr. Elwes writes: "This species seems to be widely distributed through Northern and Eastern Asia, China, and Japan. I have compared many specimens from Amurland, Shanghai, and Japan, and find them so very variable, both in size, colour, and the spots of the hindwing, that I am unable to see how the larger and brighter specimens described as *L. hellotia*, Ménétriés, and *L. praxiteles*, Felder, can be separated from *L. argiades*. As a rule the Oriental and Japanese specimens are larger and more richly spotted, especially at Tokio, Japan; but some of those from Askold and Shanghai are quite as small as German specimens of *L. polysperchon*, Bergsträsser. This variety also occurs on the Ussuri at Raddefskaia and Askold." Mr. Leech writes: "Common all over Japan and Corea during the warm months. It varies in size from ¾ inch to 1½ inches. The female also varies in colour and markings, some specimens being much suffused with blue." Mr. Pryer writes of the Japan form: "This species is very abundant, and a succession of broods appears during the year; they vary much in size, and female specimens are often to be found with more or less blue on the upperside."

In India *E. argiades* occurs in the moister portions of Ladak, throughout Kashmir, all along the Himalayas, in Assam, Burma, at Bholahât in the Malda District, Orissa, Ganjam,

Nagpur, Mhow, the Nilgiris, Travancore, Ceylon, and on the Islands of Nankowri and Katschall of the Nicobars. I am surprised to find that it does not occur on the Western Ghâts. In North America *E. argiades* appears to be as variable a species as elsewhere and in the same way. In Mr. Scudder's most full description of it at all stages he notes the difference in the sizes of the specimens, males varying from 9·5 to 15·25, and females from 10·0 to 15·0 millimetres. He also refers to the variations that obtain in the coloration and markings, the female as well being dimorphic. He considers the American insect to be a distinct species from the European and Asiatic one, and applies to it the name *E. comyntas*, Godart. He says that they are considered to be identical by "some careless authors" (p. 925), but he does not point out in what direction the supposed differences between the old and new world forms may be looked for. I have quite failed to discover them in the imago.

As writers on Indian Lepidoptera have hitherto kept *E. parrhasius* and *E. dipora* distinct, I append descriptions of them as foot-notes. I also give a description of the species as it appears in Europe by Dr. Lang.* The transformations are described on page 136 *antea*.

The figure shows both sides of a male example from Pangi in the Western Himalayas deposited in my collection.

717. **Everes kala,** n. sp. (PLATE XXVI, FIG. 181).

HABITAT: Khasi Hills.

EXPANSE: 1·0 inch.

DESCRIPTION: UPPERSIDE, *both wings* fuliginous-black. *Forewing* with a rather prominent oval disco-cellular deep black spot. *Hindwing* with a submarginal series of oval indistinct black spots, each spot outwardly defined by a fine short white line; *tail* very short, fine, black tipped with white. *Cilia* whitish marked with black. UNDERSIDE, *both wings* plumbeous-grey, a fine anteciliary black line, then a series of small oval dull fuscous spots circled by a white line; then a series of larger rather quadrate dull fuscous spots inwardly defined by a fine white line. *Forewing* with a very prominent discal series of six rounded deep black spots,

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* *Everes parrhasius*, Fabricius. HABITAT: Java (*Horsfield, Moore* and *Butler*); Bengal, Ceylon (*Moore*); Mhow (*Swinhoe*); Nicobar Isles (*Wood-Mason* and *de Nicéville*); Malacca, Singapore (*Distant*); Celebes (*Snellen*); Australia (*Semper*). EXPANSE: *Male*, 1·00; *female*, 1·25 inches. DESCRIPTION: "MALE. UPPERSIDE, *both wings* deep violet-blue, with a narrow brown outer marginal band. *Hindwing*, the band with black spots slightly bordered with white. UNDERSIDE, *both wings* greyish-white. *Forewing* with a white-bordered dusky-brown disco-cellular lunule, an outer discal lunular line, and two marginal lunular lines. *Hindwing* with three black subbasal and an apical spot, a white-bordered dusky-brown disco-cellular lunule, a discal row of lunules, and a marginal lunular line, the latter enclosing two large subanal black spots bordered with ochreous. FEMALE. UPPERSIDE, *both wings* violet-brown, the lower basal and discal areas more or less greyish-blue. *Hindwing* with a marginal row of white-bordered black spots, the two spots between the median nervules bordered with a red inner lunule." UNDERSIDE, *both wings* as in the male. (*Moore*, l. c. in Lep. Cey.)

Occurs in Ceylon at "Colombo. In open and cultivated land" (*Hutchison*). "Galle and Kandy. Very common" (*Wade*).

Everes dipora, Moore. *Lycæna dipora*, Moore, Proc. Zool. Soc. Lond., 1865, p. 506, n. 108, pl. xxxi, fig. 8, *male*; *Everes dipora*, Doherty, Journ. A. S. B., vol. lv, pt. 2, p. 132, n. 158 (1886). HABITAT: Kasauli, N.-W. Himalayas; Kashmir (*Moore*); Kumaon (*Doherty*). EXPANSE: *Male*, ·92 of an inch. DESCRIPTION: MALE. "UPPERSIDE, *both wings* dull violet-blue, exterior margins broadly brown. *Cilia* grey, with a narrow medial brown line. *Forewing* with a disco-cellular spot. *Hindwing* with a tail. UNDERSIDE, *both wings* greyish cream-colour, exterior margins defined by a brown line. *Forewing* with a narrow disco-cellular streak, and a transverse discal straight series of white-encircled black spots, a submarginal row of pale brown spots. *Hindwing* with three basal and a thrice-interrupted discal series of eight white-encircled black spots, a medially disposed marginal orange-red band, bordered inwardly with brown lunules, outwardly with (two clear, the rest ill-defined) black spots. *Cilia* as above." (*Moore*, l. c.)

"A slight delicate species, from Kasauli; not very common; generally found near water." (*Note by Colonel A. M. Lang, R. E.*)

"Everywhere [in Kumaon] from 1,000 to 10,000 feet. The red area on the hindwing below is variable. The female is dark brown above. The male is indistinguishable from *E. parrhasius*, Fabricius." (*Doherty*, l. c.) Colonel Lang has taken it near Naini Tal from 3,500 to 5,500 feet, June and July, and in the valleys above Ranikhet at about 5,500 feet in April.

Lycæna argiades, Pallas. HABITAT: Central and Southern Europe (except Britain and Spain), North-Western Asia, the South of Siberia, and the Amur. (*Lang*). EXPANSE: ·80 to 1·12 inches. DESCRIPTION: "MALE. UPPERSIDE, *both wings* violet-blue, with a narrow brown hind-marginal border. *Forewing* without spots. *Hindwing* with a short tail, two or three small brown spots along the hind margin near the anal angle. UNDERSIDE, *both wings* greyish-white, tinged with blue at the base, a faint hind-marginal orange band. *Forewing* has a narrow linear discoidal spot, and a row of seven black spots parallel to the hind margin. *Hindwing* has a row of black spots enclosed by the orange band, and an irregular row running across the medial area of the wings, besides two placed near the base. FEMALE. UPPERSIDE, *both wings* brown, slightly tinged with violet-blue at the base. *Hindwing*, besides having two or three black spots near the anal angle, shows faint traces of an orange band. UNDERSIDE, *both wings* as in the male. *Cilia* in both sexes white." (*Dr. H. C. Lang*, Butt. of Eur., p. 101, n. 4, pl. xxii, fig. 5, *male* and *female* (1884).

each spot outwardly defined by a fine white line ; of these the four first or anterior spots are in a straight line, but arranged a little outwardly obliquely across the wing ; the two lower spots are parallel to the outer margin, the posterior spot of all the largest of all ; a similar disco-cellular spot. *Hindwing* with four subbasal spots arranged in a slightly convex line across the wing, of which the anterior touches the costal nervure and is the largest ; two are in the middle of the wing and divided by the median nervure only, the posterior spot the smallest and placed on the abdominal margin ; a linear disco-cellular spot ; a discal somewhat irregular series of eight spots, of which the fourth and seventh from the costa are much larger than the others ; an oval marginal orange spot in the first median interspace. *Antennæ* with a large spatulate club, the white annulations prominent.

Described from a single specimen generously presented to me by the Rev. Walter A. Hamilton, by whose native collectors it was obtained. I do not know any species to which it can be compared, nor am I sure of the sex of the specimen, but it is probably a male. I even place it in the genus *Everes*, Moore, with great doubt. It comes into this group, as it has the first subcostal nervule of the forewing anastomosed completely with the costal nervure for a portion of its length, as I learn by applying benzine to my solitary specimen. The large size and great prominence of the spots on the underside renders this little species easy to be recognised.

The above description was written more than a year ago. Since it has been placed in type, I have discovered a solitary specimen of *Lycæna fischeri*, Eversmann, from Askold, in the collection of the Indian Museum, Calcutta. This specimen differs only from my *E. kala* on the underside of the hindwing in possessing five subbasal spots, there being an additional one on the abdominal margin ; in having a much larger expanse of orange towards the anal angle, extending over three interspaces, and the two marginal black spots divided by the first median nervule prominently sprinkled with metallic silvery scales. In spite of these differences, I am of opinion that it is more than probable that *E. kala* will ultimately be found, when more specimens of it from Assam are obtained, to be a synonym of *E. fischeri*, with which it agrees exactly in neuration. I append below for reference a description of that species.*

The figure shows both sides of the type specimen in my collection.

Everes exiguus, Distant, from Singapore, differs so markedly from the other species of the genus that I think it belongs very doubtfully to it. Its description is given below.†

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* *Everes fischeri*, Eversmann. *Lycæna fischeri*, Eversmann, Bull. Moscou, vol. xvi, p 537 (1843); id., Herrich-Schäffer. Eur. Schmett., vol. i, figs. 218, 219 (1844) ; id., Elwes, Proc. Zool. Soc. Lond., 1881, p. 888 ; id., Lang, Butt. Eur., p. 102. n. 5, pl. xxii, fig. 6 (1884) ; id., Leech, Proc. Zool. Soc. Lond., 1887, p. 415, n. 55. HABITAT : The Steppes of South-Eastern Russia ; dry meadows in the Ural Mountains and the Altai (*Lang*) ; Vladivostock and Askold in Siberia, Shanghai in China (*Elwes*) ; Gensan and Ningpo in Corea (*Leech*). EXPANSE : ·90 to 1·00 inch. DESCRIPTION : MALE and FEMALE. " UPPERSIDE, *both wings* dark brown. *Forewing* has a small dark discoidal spot. *Hindwing* with a very minute tail, a row of faint light spots placed parallel to the hind margin. *Cilia* of both wings white. UNDERSIDE, *both wings*, ground-colour light grey. *Forewing* has a double row of narrow black spots placed parallel to the hind margin ; internal to this is an irregular row of larger spots, that near the anal angle being the largest, and besides these there is a black discoidal spot surrrounded like the others by a light ring ; there are no basal spots. *Hindwing* has a double row of hind-marginal spots enclosing a faint orange band, the black spots near the anal angle being spotted with silvery green ; between this row and the narrow linear discoidal spot is an irregular row of black spots in light rings ; besides these, there are basal spots four in number."

" Like most other exclusively (*sic*) Russian species, rare and difficult to obtain." (*Lang*, l. c.)

" Found at Vladivostock and Askold, also at Shanghai, but not, as far as I know, in Japan. Chinese specimens do not agree perfectly with Siberian ones ; they are smaller, and the blue eyes do not show through the hindwing of the female ; but I do not think they can be separated.' (*Elwes*, l. c.)

"Occurs at Gensan in June. It is also very common in the snowy valley, Ningpo, in April. The pale band on the outer margin of the hindwing [on the upperside] may be either very distinct, faint, or totally absent. The spots on the underside have a great tendency to coalesce in the manner common to many of this genus" [*Lycæna*]. (*Leech*, l. c.)

† *Everes exiguus*, Distant, Rhop. Malay., p. 455, n. 2, pl. xliv, fig. 17, *female* (1886). HABITAT : Singapore. EXPANSE : *Female*, ·85 of an inch. DESCRIPTION : " FEMALE. UPPERSIDE, *both wings* pale dusky-brown, the basal areas more or less shaded with violaceous-blue. *Hindwing* with a submarginal broken lunate greyish fascia, and a marginal series of blackish spots margined with greyish, the spot between the two lower median nervules inwardly margined with reddish-ochraceous. *Cilia* greyish. UNDERSIDE, *both wings* greyish-brown. *Forewing* with three discal greyish-margined fasciæ, the first short at the end of the cell, the second extending from the bifurcation of the fourth and fifth subcostal nervules to the second median nervule, the third commencing at that nervule, its outer margin being connected with the inner margin of the second

718. **Everes umbriel**, Doherty.

E. umbriel, Doherty, Journ. A. S. B, vol. lviii, pt. 2, p. (1889).

HABITAT: Myitta, Tenasserim Valley, Burma.

EXPANSE: ♂, ·95 of an inch.

DESCRIPTION: "MALE. UPPERSIDE, *both wings* black. *Cilia* of the forewing anteriorly black, whitish at the lower angle, of the hindwing whitish, except at the ends of the veins where it is black. UNDERSIDE, *both wings* grey-white (much whiter than in *E. kala*, de Nicéville); with the following blackish markings, the discal ones quadrate :—*Forewing* with a streak across the end of the cell, a broad straight transverse discal band, inwardly dislocated below the second median nervule, the lower part outwardly oblique; outer margin widely dark, containing an inner lunular and an outer slender straight whitish fascia. *Hindwing* with a large subcostal, a smaller cellular, and a minute abdominal spot, all near the base; a streak across the end of the cell, and a broad discal transverse band broken into four quadrate masses, of which only the upper two touch each other, the first covering two interspaces, the second (strongly dislocated outwardly) covering three interspaces, the third (nearer the base, oblique) covering two interspaces, and the fourth being a small lunule between the submedian and the internal nervures; outer margin broadly dark, containing a row of whitish lunules (the subanal one orange) surrounding black spots, of which the two subanal ones are touched with metallic green; a whitish submarginal and a black marginal line, both very slender." *Cilia* of the forewing outwardly black, inwardly narrowly white, becoming entirely white towards the anal angle; of the hindwing almost entirely white, just touched with black at the ends of the veins. *Tail* black, the tip white.

"The broad broken quadrate discal bands of the underside easily distinguish this peculiar species from *Everes kala*, which has rows of round black spots instead. The type specimen of *E. kala* is in my opinion a male, so that these two species have wholly lost the usual blue colour of their allies, in this resembling *Everes nyseus*, Guérin. That species, which seems also to occur near Myitta (though I did not capture any) differs slightly from the typical *Everes* in having the disco-cellular nervules of both wings meeting at a perceptible angle, but it seems scarcely worth while to retain the genus (*Talicada*, Moore) which has been founded on it." (*Doherty*, l. c.) With reference to this last remark, from my bleached examples of both species, I do not find that there is much difference in the angle at which the disco-cellular nervules of both wings meet.

E. umbriel certainly looks much more distinct from *E. fischeri* than does *E. kala*, but like that species it has the metallic greenish speckles at the anal angle of the hindwing below, which my species lacks. The coalescing of the discal spots of the underside is probably an aberrational character, as pointed out above by Mr. Leech in *L. fischeri*, and it is on these markings that *E. umbriel* has chiefly been founded. It will probably be found to be a synonym of *E. fischeri* on an examination of a large series from Burma.

Genus 118.—NACADUBA, Moore. (PLATES XXVI and XXVII).

Nacaduba, Moore, Lep. Cey., vol. i, p. 88 (1881); id., Distant, Rhop. Malay., p. 218 (1884).

"FOREWING, triangular; *costa* regularly arched, [*apex* sometimes rounded, sometimes very acute], *exterior margin* slightly convex, [sometimes straight], *posterior* margin straight; *costal nervure* extending to half length of the margin, bent upwards to the costa near its end; *first subcostal nervule* emitted at one-third before the end of the discoidal cell, short,

fascia, a submarginal greyish-margined fascia, and a small subcostal greyish-margined spot on the inner side of the second discal fascia. *Hindwing* with three discal greyish-margined fasciæ, the first shortish at the end of the cell, the second longest and reaching the second median nervule, the third commencing at that nervule, its inner margin connected with the outer margin of the first; two greyish-margined spots at base, one in and one beneath the cell; beyond the outer fascia is a greyish lunulate line, and a marginal series of greyish-bordered spots, the spots between the two lower median nervules broadly margined inwardly with reddish-ochraceous, and a small ochraceous spot at anal angle; two black grey-margined subcostal spots. *Body* and *legs* more or less concolorous with wings." (*Distant*, l. c.)

The figure and description of this species agrees minutely with specimens of *Catochrysops strabo*, Fabricius. I am strongly of opinion that it is that species, but cannot be sure without seeing the unique type specimen. From the figure it has all the appearance of a *Catochrysops*, none whatever of any *Everes* known to me.

curved upwards and touching the costal nervure, *second* subcostal at one-fourth, *third* subcostal close to the end of the cell, *fourth* subcostal at beyond one-half from the third and terminating at the apex, fifth subcostal [*upper discoidal*] from the end of the cell; *disco-cellular* nervules slightly concave, radial [*lower discoidal*] nervule from their middle; *discoidal cell* broad, long, extending more than half the wing; *second median nervule* from the angle before the end of the discoidal cell, *first* median at one-third before the end; *submedian nervure* straight. HINDWING, bluntly oval, furnished with a single slender *tail* [at the termination of the first median nervule, sometimes wanting]; *costal nervure* arched at the base; *first subcostal nervule* curved upwards, emitted at one-sixth before the end of the cell; *disco-cellular* nervules slightly oblique, *discoidal* nervule from their middle; *discoidal cell* broad; *third* and *second median nervules* from the end of the cell, *first* median at nearly one-half before the end; *submedian* and *internal nervures* straight. BODY moderate, rather short; *palpi* porrect, second joint extending more than half beyond the head, laxly pilose beneath; *legs* slender; *antennæ* with the club grooved, pointed. *Eyes* hairy. Type, *N. prominens*, Moore." (*Moore*, l. c.)

In the forewing the costal nervure terminates about opposite to the apex of the cell; the first subcostal nervule immediately after its origin is directed up to the costal nervure, with which it completely anastomoses for some little distance; the vein is not short as Mr. Moore supposes, being of ordinary length; the second subcostal has its base nearer to the base of the first subcostal than to that of the upper discoidal; the third subcostal is rather short, emitted about midway between the apex of the wing and the base of the upper discoidal; the discoidal cell does not extend beyond the middle of the wing; the disco-cellular nervules upright; the second median nervule emitted a little before the lower end of the cell.

The chief peculiarity of the genus is the presence in it of two groups, a tailed and a tailless. The tailed group consists of two distinct species, and a third, which I believe to be dimorphic, has one form tailed, the other tailless. Had it not been for the existence of these three species, and of the single species of the genus *Megisba*, Moore, it would have been easy to divide the true "blues" (as distinct from the "coppers" and "hairstreaks") into two groups, one furnished with tails, the other lacking them; but *Nacaduba* comprising within itself a species combining both characters, besides others with and without this feature, and *Megisba malaya*, Horsfield, also having tails in some individuals, lacking them in others, rendered that course impossible. Breeding may hereafter prove that the tailed and tailless forms of *N. ardates*, Moore, the dimorphic species, are truly distinct species, though the neuration of the imagines of the two forms is precisely similar, in which case it would be convenient to place the tailless form of *N. ardates*, together with *N. dana*, de Nicéville, and *N. hampsonii*, de Nicéville, in a separate genus. The two forms of *N. ardates* may be distinct, though I much doubt it; but I feel quite sure that the tailed and tailless forms of *M. malaya* represent but one species.

All the species of the genus *Nacaduba* are of some shade of blue, violet, or plumbeous-purple on the upperside in the male, with a narrow outer black margin. The underside of both sexes is of a greyish or ochreous-brown colour, crossed by whitish lines in pairs or catenulated bands; there is usually a prominent black spot on the outer margin in the first median interspace of the hindwing usually crowned with orange and marked with some metallic-greenish scales. The female has the upperside black, the disc and base of both wings more or less marked with blue or purple iridescent scales, which in *N. atrata*, Horsfield, look pearly white in some lights. The outer margin of the hindwing usually bears a series of black spots, that in the first median interspace being the largest.

As regards the distribution of the genus, two species, *N. nora* and *N. macrophthalma*, both of Felder, have been recorded from Australia, otherwise it appears to be strictly confined to the Indo-Malayan region. The genus has so lately been constituted that it is impossible to say how many species it contains. It seems to be a natural one, all the species have a similar *facies*, and are readily recognisable. The transformations of a single species, *N. prominens*, Moore, are known, and will be found very briefly described under the description of that species. Both the larva and pupa appear to be of the usual lycænid type.

Key to the Indian species of Nacaduba.

A. Underside, forewing, basal area unmarked.

- *a.* Underside, both wings brown, no series of prominent fuscous marginal spots.
  - *a^1.* Male, upperside, dark purple ; underside, markings wide and sullied.
    - 719. N. MACROPHTHALMA, Sikkim, Bhutan, Assam, South India, Ceylon, Andaman and Nicobar Isles, Malay Peninsula, Borneo, Philippines, Australia.
  - *b^1.* Male, upperside, bluish-purple ; underside, markings narrow and white.
    - 720. N. PAVANA, Sikkim, Bhutan, Cachar, Mergui, Andaman Isles, Java.
- *b.* Underside, both wings pale greyish-brown, a double series of marginal prominent fuscous spots.
  - 721. N. KERRIANA, Upper Burma, Malay Peninsula.

B. Underside, forewing, basal area marked with two white strigæ in addition to those on the disc.

- *a.* Apex of forewing highly acute, outer margin straight.
  - *a^1.* Basal fascia on underside of forewing reaching submedian nervure.
    - *a^2.* Underside, both wings, ground-colour violet-grey.
      - 722. N. VIOLA, Sikkim, Assam, Burma, Malay Peninsula, Nilgiris, Ceylon, Andaman Isles.
    - *b^2.* Underside, both wings, ground-colour pale hoary-brownish.
      - 723. N. NORA, Andamans, Amboina, Australia.
  - *b^1.* Basal fascia on underside of forewing not extending below median nervure.
    - 724. N. NORRIA, Ceylon.
- *b.* Apex of forewing somewhat rounded, outer margin convex.
  - *a^1.* Hindwing furnished with a tail.
    - *a^2.* White markings on underside in both sexes very prominent ; female, upperside, forewing with the iridescent blue discal patch appearing to be white in some lights.
      - 725. N. ATRATA, Malda, Sikkim, Bhutan, Assam, Nilgiris, Ceylon, Malay Peninsula, Java.
    - *b^2.* White markings on underside in both sexes less prominent ; female, upperside, forewing with the discal patch never transmitting a white light.
      - *a^3.* Basal band on underside of forewing reaching submedian nervure.
        - *a^4.* Male, upperside plumbeous-purple, with very narrow outer black marginal thread.
          - *a^5.* Male, upperside deep purple, forewing somewhat narrow.
            - 726. N. PROMINENS, Malda, Sikkim, Bhutan, Assam, Orissa, North Canara, Nilgiris, Shevaroys, Ceylon.
          - *b^5.* Male, upperside paler purple, forewing somewhat broader than in *N. prominens.*
            - 727. N. PLUMBEOMICANS, Burma, Andaman and Nicobar Isles.
        - *b^4.* Male, upperside bluish-purple, with somewhat broad outer black margins ; underside with bands filled in with dark brown, very prominent.
          - 728. N. CŒLESTIS, Kumaon, Sikkim, Assam, Andaman Isles.
      - *b^3.* Basal band on underside of forewing reaching median nervure only.
        - 729. N. BHUTEA, Sikkim.
  - *b^1.* Hindwing sometimes furnished with a tail, sometimes tailless ; of very small size, the smallest in the genus.
    - 730. N. ARDATES, India, Ceylon, Burma, Andaman and Philippine Isles.
  - *c^1.* Hindwing never furnished with a tail.
    - *a^2.* Male, upperside violet-blue ; underside, markings inconspicuous.
      - 731. N. DANA, Kumaon, Malda, Sikkim, Bhutan, Burma, Nilgiris.
    - *b^2.* Male, upperside deep violet-purple ; underside, markings conspicuous.
      - 732. N. HAMPSONII, Dehra Dun, Nilgiris.

719. Nacaduba macrophthalma, Felder.

Lycæna macrophthalma, Felder, Verh. zool.-bot. Gesellsch. Wien, vol. xii, p. 483, n. 115 (1862) ; idem, id., Reise Novara, Lep., vol. ii, p. 275, n. 339, pl. xxxiv, fig. 35, *male* (1865) ; *Lampides macrophthalma*, Butler, Trans. Linn. Soc. Lond., Zoology, second series, vol. i, p. 547, n. 2 (1877) ; *Nacaduba macrophthalma*, Moore, Lep. Cey., vol. i, p. 89, pl. xxxvii, figs. 4, 4*a*, *male* (1881) ; id., Butler, Ann. and Mag. of Nat. Hist., fifth series, vol. xi, p. 417, n. 59 (1883) ; id., Wood-Mason and de Nicéville, Journ. A. S. B., vol. lv, pt. 2, p. 367, n. 123, pl. xvii, fig. 13, *male* (1886) ; id., Distant, Rhop. Malay., p. 218, n. i, pl. xx, fig. 3, *male* (1884) ; p. 454, n. i, pl. xliv, fig. 8, *female* (1886) ; *Lampides* confr. *pactolus*, Wood-Mason and de Nicéville, Journ. A. S. B., vol. xlix, pt. 2, p. 230, n. 40 (1880).

HABITAT: Sikkim, Bhutan, Assam, South India, Ceylon, Andaman and Nicobar Isles, Malay Peninsula, Borneo, Philippine Isles, Australia.

EXPANSE: ♂, 1·2 to 1·6; ♀, 1·3 to 1·5 inches.

DESCRIPTION: "MALE. UPPERSIDE, *both wings* plumbeous-violascent. UNDERSIDE, *both wings* palely hoary-fuscous, with two macular cognate submarginal fasciæ, fuscous circled with whitish (evanascent in the forewing). *Forewing* with a disco-cellular fasciole and a fascia beyond it, broken at the second median nervule. *Hindwing* with a basal fascia, a disco-cellular fasciole and a contiguous external chain-shaped bent fascia of the ground-colour, circled with fuscous and whitish, indistinct, with a large posterior black ocellus, inwardly circled with a narrow yellowish lunule, outwardly divided with a slender metallic arch set on a whitish anal striga, and a pair of minute anal spots of the same colour."

"Has more acute forewings than the allied *L.* [=*N.*] *hermus*, Felder," from Amboina. (*Felder*, l. c. in Reise Novara).

The type specimen was obtained on Pulo Milu, one of the Nicobar Isles, and the late Mr. de Roepstorff and Mr. Man have obtained it on Kamorta, Nankowri, and Great Nicobar. I have before me three males only from the Nicobars, one from each of the above-named islands, and they present considerable differences in the shade of purple on the upperside and in the prominence of the markings on the underside; when male specimens from the Andamans, Ceylon, Ootacamund, Sikkim, Bhutan, Assam, and Burma are brought together, these differences are still more marked. The only conclusion I can come to is either that many slight local races have arisen, which perhaps may not be constant to locality, or that the differences observed may be due to seasonal causes. The females show as great variation as do the males; three from Ceylon have the metallic blue area confined to a small patch on the disc of the forewing; another from Ceylon has it fully one-third larger, while a third from the same locality has the upperside almost entirely blue, leaving a narrow black border only. If such marked differences extend to the species when inhabiting a small region like the Island of Ceylon, it is not much to be wondered at if as great differences manifest themselves when a much larger region is considered. In the Nilgiris a curious seasonal form of the male occurs; it has the discal fascia of the forewing on the underside filled in anteriorly with blackish, and a large discal patch of the same colour on the hindwing. Mr. E. E. Green possesses a very similar female specimen taken in Ceylon. Mr. G. F. Hampson informs me that this form occurs in the Nilgiris in the rains, the common form appearing in the dry season; this form of differentiation between wet and dry season broods recalls that obtaining in *Lampides œlianus*, Fabricius; indeed in general *facies* and style of markings on the under surface *Lampides* and *Nacaduba* have a strong superficial likeness. Elsewhere, however, I have not observed any similar seasonal variation in *Nacaduba*.

I give below a very full description* of the commonest form of the species which occurs in the Andaman Isles, Cherrapunji and Sibsagar in Assam, and in Sikkim and Bhutan,

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* *Nacaduba macrophthalma*, Felder. *Lampides* confr. *pactolus*, Wood-Mason and de Nicéville, Journ. A. S. B., vol. xlix, pt. 2, p. 230, n. 40 (1880). HABITAT: South Andaman Isles, Cherrapunji, Sibsagar, Sikkim. EXPANSE: *Male*, 1·2 to 1·4; *female*, 1·5 inches. DESCRIPTION: "FEMALE. UPPERSIDE much as in *L.* =*N.*] *pactolus*, Felder [from Amboina], differing in having the dark fuscous outer border of the *forewing* spotless, and that of the *hindwing* very much less distinctly marked in the same manner; no disco-cellular mark in either wing, and the whole upperside apparently more clouded with smoky fuscous scales. UNDERSIDE, *both wings* very pale fuscous, with a submarginal fascia composed of rhomboid spots, and a marginal one of narrow oval spots fuscous of a rather darker shade than the ground, both margined and connected together by whitish, the latter of them developed in the hindwing, in the interval between the first and second median nervules, into a conspicuous jet-black circular spot divided externally by a semi-circle of pale blue metallic scales and encircled internally by luteous-white, and into two minute ones, one on each side of the submedian nervure, internally covered with blue scales. *Forewing* with two small subcostal spots, a short disco-cellular fasciole, and a discal fascia strongly faulted at the second median nervule, so that the outer white margin of its posterior portion is in line with the inner white margin of its anterior portion, and the inner white margin of its posterior portion is in line with the disco-cellular nervules. *Hindwing* with a similar disco-cellular fasciole, and complexly faulted and contorted discal and basal fasciæ; all the fasciæ in all the wings margined on both sides with fuscous of a very slightly deeper tint than the ground and with whitish. MALE. UPPERSIDE, *both wings* semi-translucent palish fuscous, with a light and tolerably brilliant amethystine lustre, edged with a darker rather broad anteciliary line. UNDERSIDE, *both wings* much as in the female, but with the macular submarginal fuscous fasciæ broader, and the anal and subanal black spots of the *hindwing* rather larger and conspicuously encircled with fulvous internally." (*Wood-Mason* and *de Nicéville*, l. c.)

which was described by Mr. Wood-Mason and myself as a species allied to the *Lycæna pactolus* of Felder, but apparently distinct from *N. macrophthalma*, from which, however, I do not think it wise to separate it.

Next to *N. ardates*, Moore, *N. macrophthalma* is the commonest species of the genus, and males may be often met with in Sikkim at low elevations sucking up moisture from damp spots. Mr. Butler records this species from Borneo and Australia (Trans. Linn. Soc. Lond., Zoology, second series, vol. i, p. 566 (1877), it has therefore the greatest geographical range of all the species of the genus. The females of all the species appear to be very rare in all localities.

720. Nacaduba pavana, Horsfield. (Plate XXVI, Fig. 182 ♂).

Lycæna pavana, Horsfield, Cat. Lep. E. I. Co., p. 77, n. 12 (1828); *Nacaduba pavana*, Wood-Mason and de Nicéville, Journ. A. S. B., vol lv, pt. 2, p. 367, n. 124 (1886); *N. macrophthalma*, Moore (*nec* Felder), Journ. Linn. Soc. Lond., Zoology, vol. xxi, p. 40 (1886).

Habitat: Java (*Horsfield*), Sikkim, Bhutan, Cachar, Mergui, Andaman Isles.

Expanse: ♂, ·8 to 1·5; ♀, 1·0 to 1·2 inches.

Description: "Male. Upperside, *both wings* pale violet-blue, which tint being almost equally diffused over a grayish-brown ground, has, in a certain position, a pale silvery reflexion; margin terminated by a very narrow brown thread and a grayish *cilia*. Underside, *both wings* grayish-brown with a pale silvery reflexion; forewing with seven, hindwing with ten white strigæ, of which three are marginal, continued uniformly through both wings to the anal ocelli, and bounded exteriorly by a deep black thread. *Forewing* has the medial portion marked by two pairs of strigæ, extending half across the surface, being here terminated abruptly at one of the longitudinal nerves; their direction is regularly transverse, and they are slightly undulated; the interior pair is short, and arises at a small distance from the costa; in the intermediate space a small dot is regularly opposed to each striga; the second pair touches the costa and reaches regularly to the disc; in the posterior portion of the surface one striga opposed to each of these pairs, is continued parallel with the other to the interior margin. In the *hindwing* the strigæ, seven in number, are not arranged in pairs, but follow nearly at equal distances, broken and interrupted by obscurer lines, without any curve in the anal region; the basal one is minute, close to the thorax, and in some individuals very obscure; three ocellated spots of an intense black colour, but very unequal in size, are placed in the anal angle at the posterior margin; the exterior one is very large, regularly orbicular, bounded interiorly, and at the sides by a very narrow yellowish-brown iris, and exteriorly by a crescent of silvery irrorations; adjoining to this is an excavated irregularly-reniform spot, which touches a minute ocellus at the extremity of the anal angle; the intermediate spot is marked interiorly with silvery irrorations and a rufous crescent, and the extreme ocellus is also slightly spangled. *Tail* brown, tipt with white. *Body* brown above and white underneath. *Antennæ* brown, very obscurely banded with gray. Female. Upperside, *forewing* with a defined brown border extending along the exterior and posterior margins, on the base and disc the violet colour is deeper than in the male, and the silvery gloss is more intense. *Hindwing* has a series of dark brown spots parallel with the posterior margin, of which the penultimate one, opposite the caudal appendage, has a deeper tint; these spots are bounded exteriorly by an intense white thread, and interiorly by a series of obscure lunules directed outwards." Underside, *both wings* as in the male. (*Horsfield*, l. c.)

This species is, perhaps, included in the Indian fauna erroneously, but as I have before me a large series of specimens which appear to me to be distinct from the commonest form of *N. macrophthalma*, Felder, described in a foot-note on the preceding page, and which agree with Horsfield's description of *N. pavana*, I prefer to include them under that name rather than describe them as a new species. These specimens may at once be known in both sexes on the underside by all the bands being white, and not sordid white as in *N. macrophthalma*, and much narrower and better defined. The male may be distinguished by its paler blue coloration on the upperside, and narrower outer black margin. It is, I think, a perfectly good and distinct species.

N. pavana occurs in Sikkim much less commonly than *N. macrophthalma*, also in Bhutan, Cachar, the Andaman Isles, and in the Mergui Archipelago. The specimens from the last-named locality were identified by Mr. Moore as *N. macrophthalma*.

The figure shews both sides of a male specimen from Cachar in the collection of the Indian Museum, Calcutta.

721. Nacaduba kerriana, Distant.

N. kerriana, Distant, Ann. and Mag. of Nat. Hist., fifth series, vol. xvii, p. 253 (1886); idem, id., Rhop. Malay., p. 455, n. 7, pl. xlii, fig. 12, *male* (1886).

HABITAT: Thoungyeen forests, Upper Burma; Malacca; Singapore.

EXPANSE: ♂, 1·4 inches.

DESCRIPTION: MALE. "UPPERSIDE, *both wings* pale lavender-blue. *Forewing* with the costal margin narrowly, and the outer margin more broadly fuscous. *Hindwing* with the outer margin fuscous; and with marginal fuscous spots separated by the median nervules, and which are divided from the outer margin by narrow greyish linear markings. *Tail* fuscous, apex greyish-white. UNDERSIDE, *both wings* pale greyish-brown. *Forewing* with the following whitish fasciæ:—one crossing the cell just before the apex, and extending from the subcostal nervure to near the inner margin; a short disco-cellular fascia just beyond the end of the cell, preceded by a small spot between the second and third subcostal nervules; these are followed by a fascia which nearly crosses the whole breadth of the wing, commencing at the second subcostal nervule and extending to near the inner margin; the outermost fascia being shorter, and commencing at the lower subcostal nervule terminates on the second median nervule; outer margin broadly whitish, containing a double series of dark fuscous spots; extreme margin dark fuscous. *Cilia* brownish. *Hindwing* crossed by a series of whitish fasciæ, the outer margin as on the forewing with two marginal black spots, which are separated by the second [first] median nervule and are irrorated by bluish scales and preceded by ochraceous shading. *Body* above and beneath more or less concolorous with the wings; *legs* fuscous, streaked with greyish." (*Distant*, l. c. in Rhop. Malay.)

I possess a single male of this species which agrees on the upperside exactly with Mr. Distant's figure; the underside differs in the ground-colour being paler, the white fasciæ consequently less distinct. It was taken by Major C. T. Bingham in the Thoungyeen forests, Upper Burma, on 1st April, 1882. It is a most singular looking insect, and I certainly should have treated it as an aberration or " sport " of *N. macrophthalma*, Felder, had not Mr. Distant described it as a distinct species from specimens from two localities. In my specimen the double marginal series of black spots on both wings on the underside are very prominent owing to the ground-colour being almost pure white; this feature would alone make *N. kerriana* easily distinguishable, though it is probably less prominent in the type specimen.

722. Nacaduba viola, Moore. (PLATE XXVII, FIG. 183 ♂).

Lampides viola, Moore, Ann. and Mag. of Nat. Hist., fourth series, vol. xx, p. 340 (1877); *Nacaduba viola*, Moore, Lep. Cey., vol. i, p. 89, pl. xxxviii, figs. 1, 1*b*, *male*; 1*a*, *female* (1881); idem, id., Journ. Linn. Soc. Lond., Zoology, vol. xxi, p. 40 (1886); id., Distant, Rhop. Malay., p. 219, n. 3, woodcut n. 65, *male*, pl. xx, fig. 24, *male* (1884); id., Wood-Mason and de Nicéville, Journ. A. S. B., vol. lv, pt. 2, p. 367, n. 125, pl. xvii, fig. 12, *male* (1886); *Nacaduba* prox. *viola*, de Nicéville, Journ. A. S. B., vol. liv, pt. 2, p. 3, n. 296 (1885); *Lycænesthes merguiana*, Moore, Journ. A. S. B., vol. liii, pt. 2, p. 23 (1884).

HABITAT: Sikkim, Cachar, Sibsagar, Mergui, Malacca, Singapore, Nilgiris, Ceylon, Andaman Isles.

EXPANSE: ♂, ·9 to 1·3; ♀, 1·0 to 1·1 inches.

DESCRIPTION. "MALE. UPPERSIDE, *both wings* dark violet-blue, with a narrow black marginal line. *Cilia* whitish at the edge. UNDERSIDE, *both wings* violet-grey, with six broken very pale narrow delicate whitish bands. *Forewing* with the two inner and outer bands short. *Hindwing* with a small black anal and large subanal spot, speckled with blue and ochreous-bordered. FEMALE. UPPERSIDE, *forewing* smalt-blue in the middle. *Hindwing* with an indistinct marginal row of pale-bordered black spots," (*Moore*, l. c. in Ann. and Mag. of Nat. Hist.)

Mr. Moore makes no mention, either in his original description of this species, or in his "Lepidoptera of Ceylon," of either of the characters which separate this species from all others of the genus known to me, except *N. nora*, Felder, *viz.*, the very acute apex and straight outer margin of the forewing, and the posteriorly attenuated hindwing, with the outer margin very straight. Mr. Distant's figures do not show these characteristics at all, and I am inclined to doubt that he has described and portrayed the true *N. viola*. Mr. Moore's description also appears to be incorrect. He says that "the two inner and outer bands on the forewing on the underside are short." In all the specimens I have seen, several of which have been identified by Mr. Moore, only the middle pair of bands on either side of the disco-cellular nervules are short, the other two pairs extending nearly across the wing. I have not seen a female.

N. viola is a rare species. The Indian Museum, Calcutta, possesses four males taken during the cold season by Dr. J. Anderson in the Mergui Archipelago, and Mr. Wood-Mason obtained a single specimen in Cachar. I possess seven specimens only, one from Sibsagar taken by Mr. S. E. Peal, one from Jorehât taken by Mr. J. L. Sherwill, one from Ceylon taken by Mr. Fairlie, two from the Andaman Isles taken by Mr. R. Wimberley, and Mr. W. Davison has sent me two males taken by him at Singapore. The Mergui specimens were described as below as a distinct species.*

The figure shews both sides of a male example from Cachar in the collection of the Indian Museum, Calcutta.

723. **Nacaduba nora**, Felder.

Lycæna nora, Felder, Sitz. Ak. Wiss. Wien, Math.-Nat. Cl., vol. xl, p. 458, n. 37 (1860); idem, id., Reise Novara, Lep., vol. ii, p. 275, n. 341, pl. xxxiv, fig. 34, *male* (1865); id., Herrich-Schäffer, Stett. Ent. Zeit., vol. xxx, p. 72, n. 24 (1869); *Lampides nora*, Semper, Journ. des Mus. Godef., vol. xiv, p. 157, n. 59 (1879); *Nacaduba nora*, de Nicéville, Journ. A. S. B., vol. lii, pt. 2, p. 73, n. 11, pl. i, fig. 14, *female* (1883); *Lycæna felderi*, Murray, Trans. Ent. Soc. Lond., 1874, p. 527, pl. x, figs. 4, *male*; 6, *female*.

HABITAT: South Andaman Isles (*de Nicéville*), Amboina (*Felder*), Australia (*Herrich-Schäffer*, *Murray* and *Semper*).

EXPANSE: ♂, ♀, 1·0 inch.

DESCRIPTION: "MALE. UPPERSIDE, *both wings* leaden-violaceous, with a line before the cilia and the apices of the nervules blackish-fuscous. UNDERSIDE, *both wings* pale hoary-brownish, the anteciliary line as on the upperside, with submarginal lunules more palely bordered on both sides, outwardly circled with ochraceous powdering, and fuscous contiguous submarginal spots outwardly circled with whitish, a subbasal fascia, a disco-cellular fasciole, and a fascia contiguous to it at the second median nervule, here, and also in the hindwing, broken at the second subcostal nervule, all chain-shaped, yellowish, laterally margined with fuscous and whitish. *Hindwing* with a hinder spot inwardly with an encircling yellowish lunule, outwardly cut through with a slender metallic arch, and a pair of minute anal spots, black, inwardly bordered with metallic and yellowish."

"Smaller than the preceding [*N. beroë*, Felder, from Luzon], also differing in the longer forewing and the shorter interior margin of the hindwing." (*Felder*, l. c. in Reise Novara.)

FEMALE. "UPPERSIDE, *both wings* smoky deep purple. *Hindwing* with a marginal series of increasing whitish lunules, the one between the first and second median nervules enclosing a prominent black spot, the anal one two much smaller spots. UNDERSIDE, *both wings* bright castaneous brown. *Forewing* with a catenulated band across the middle of the cell from the subcostal nervure to the inner margin, a similar band closing the cell, a discal

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* *Lycænesthes merguiana*, Moore, Journ. A. S. B., vol. liii, pt. 2, p. 23 (1884). HABITAT: Mergui. EXPANSE: *Male*, ·9 of an inch. DESCRIPTION: "MALE. UPPERSIDE, *both wings* violet-blue. *Hindwing* with two indistinct small anal blackish spots and a larger subanal spot. UNDERSIDE, *both wings* dull greyish-brown. *Forewing* with a transverse antemedial pale-bordered band, a short band at the end of the cell, and a broken discal band, two submarginal pale lunular lines. *Hindwing* with a pale-bordered subbasal band, one at the end of the cell, and a broken curved discal band; two submarginal pale sinuous lines enclosing a small anal and a large oval subanal black spot, both surmounted by a yellow lunule and speckled with a few metallic-blue scales."

"A much smaller species than *L. bengalensis*, Moore [=*L. emolus*, Godart]. Distinguished from it, on the underside, in the forewing having the antemedial pale-bordered band, and in the hindwing in the more irregular and zigzag pale bands, and the large subanal spot. It is also distinct from *L. lycænina*, Felder." (*Moore*, l. c.)

band of spots somewhat broken and directed inwards at the fifth spot from the costa, a submarginal band of lunules, marginal linear spots and black anteciliary fine line. *Hindwing* with a basal chain of spots, another closing the cell, and a discal much curved and broken band; marginal markings as on the forewing, but with a prominent subanal black spot between the first and second median nervules, crowned with an orange lunule, and marked outwardly with a few metallic-green scales; two minute similar spots at the anal angle."

"Mr. de Roepstorff has sent a single specimen which seems to be identical with Felder's *L.* [= *N.*] *nora.* It is allied to *N. ardates,* Moore, but differs in the discal chain of spots on the underside of the forewing being larger and less broken, also in the straighter outer margin of that wing." (*de Nicéville,* l. c.)

The specimen above referred to is still unique in the collection of the Indian Museum, Calcutta. It agrees minutely with the description of *L. felderi,* Murray, and I have no doubt that Semper was quite right in placing that species as a synonym of *N. nora.* It is by no means unlikely that *N. viola,* Moore, will have to be added to the synonymy of *N. nora,* as it is highly probable that my Andaman female of *N. nora* is the opposite sex of my two male examples of *N. viola* from the same locality; for beyond the usual sexual differences observed in this genus, there is only the colour of the ground on the underside by which to distinguish between them, and this latter is a most variable character in some species of this genus, as I have pointed out under the description of *N. ardates,* Moore.

724. **Nacaduba noreia,** Felder.

Lycæna noreia, Felder, Verh. zool.-bot. Gesellsch. Wien, vol. xviii, p. 282 (1868).

HABITAT: Ceylon.

EXPANSE: Not given.

DESCRIPTION: "FEMALE. A geographical form of *L.* [=*N.*] *nora,* Felder, but with the external margin less convex in the forewing. UPPERSIDE, *both wings* brownish-fuscous. *Forewing* with the interno-basal patch subtriangular. *Hindwing,* with the basal patch violaceous-blue, the marginal spots more obscure, the usual extra-caudal one excepted, very obsolete. UNDERSIDE, *both wings* hoary-fuscescent, a disco-cellular spot (in the hindwing rather narrow), a chain-shaped fascia beyond the middle once broken, with an antico-basal fasciole on the forewing, not going beyond the median nervure, and a basal fascia on the hindwing composed of four spots and within it an anterior incomplete spot, fuscous, circled with whitish, filled up with the ground-colour, with somewhat fuscous marginal spots (in the hindwing more triangular), the extra caudal one larger, and the minute black anal pair on the hindwing excepted, circled with whitish, set upon concolorous spots lunate in the forewing and sagittate in the hindwing, with a fuscous marginal line, and a whitish line before the cilia cut through by fuscous spots at the tips of the veins." (*Felder,* l. c.)

N. noreia appears never to have been recognised since it was first described, and is not included by Mr. Moore in his "Lepidoptera of Ceylon." It is said to have the exterior margin of the forewing less convex than in *N. nora,* Felder, in which case it must indeed have a straight outer margin; then, on the underside of the forewing, the antico-basal fasciole is said not to extend beyond the median nervule; no species of the genus known to me presents this feature, except *N. bhutea* and *N. hampsonii,* mihi. The type specimen is said to have been taken at Niuera Ellia, at about 6,000 feet, on 24th December, 1864.

725. **Nacaduba atrata,** Horsfield.

Lycæna atratus, Horsfield, Cat. Lep. E. I. Co., p. 78, n. 13 (1828); *Nacaduba atrata,* Moore, Lep. Cey., vol. i, p. 89 (1881); id., Wood-Mason and de Nicéville, Journ. A. S. B., vol. lv, pt. 2, p. 366, n. 121 (1886); *Lycæna kurava,* Moore, Horsfield and Moore, Cat. Lep. Mus. E. I. C., vol. i, p. 22, n. 10 (1857).

HABITAT: Java (*Horsfield*), Malda, Sikkim, Assam, Bhutan, Cachar, Ootacamund, Ceylon, Malay Peninsula.

EXPANSE: ♂, 1·2 to 1·5; ♀, 1·25 to 1·30 inches.

DESCRIPTION: "FEMALE. UPPERSIDE, *both wings* shaded with violet-blue from the base towards the margin, on a brownish ground transmitting a white patch on the disc. *Forewing*

with the exterior and posterior margins dark blackish-brown. *Hindwing* along the posterior margin marked with a series of oblong brown spots, enclosed by two undulated white threads, the interior one being bounded by a deep brown fascia, and the exterior one by a blackish margin fringed with grayish-brown. UNDERSIDE, *both wings* brown, with a shade of silvery gray; with three white marginal strigæ extending uniformly through both wings. *Forewing* with six white strigæ following each other, after nearly equal intervals, from a small vacancy at the base to the marginal series; they do not arise in contact with the costa, but a small intervening space is occupied by four marginal dots, in irregular succession, of which the two posterior ones are most distinct; the first three interior strigæ are parallel and nearly regularly transverse; the fourth is very short; the fifth extends across the surface with a slight obliquity inwards; the sixth terminates in the middle of the surface. *Hindwing* with seven transverse strigæ occupying the whole surface to the marginal series; the basal one is short and obscure, the remaining are broken, and a short lineola is placed, in some cases, intermediately between the successive strigæ; they have a very slight curve towards the anterior margin: there are three anal ocelli, agreeing in character with those of *L.* [= *N.*] *pavana*, Horsfield [from Java]; one exterior, near the margin large and regularly orbicular; the next reniform, with a more saturated tint at the lobe which touches the interior ocellus situated at the extreme anal angle, and more pronounced than in the allied species [*N. pavana*]; the two anterior ocelli are connected by a short streak of silvery irrorations covering their inner border and bounded by a short rufous fascia. *Antennæ* and *abdomen* obscurely banded with white, the *thorax* and *body* are anteriorly covered with gray hair." (*Horsfield*, l. c.) MALE. UPPERSIDE, *both wings* plumbeous-purple, with a narrow outer black margin. UNDERSIDE, *both wings* as in the female.

"Closely allied to *N. prominens*, Moore, but comparatively smaller in size. MALE. UPPERSIDE, *both wings* of a uniformly darker grey-blue. UNDERSIDE, *both wings* with the white bands more distinct, the marginal band encloses a series of black spots, and the submarginal band is more acutely sinuous with black interspaces. FEMALE. UPPERSIDE, *both wings* of a more intense and darker glistening blue, the brown outer borders broader." UNDERSIDE, *both wings* as in the male. (*Moore*, l. c. in Lep. Cey.)

Unfortunately Mr. Moore does not figure this species in his "Lepidoptera of Ceylon." From his description of it, it appears to have the white bands of the underside more distinct than in *N. prominens*, the marginal band enclosing a series of black spots, and the submarginal band more acutely sinuous with black interspaces. It is easy from these characters to pick out specimens of typical *N. atrata*, but the matter is complicated to me by the possession of one male from Ootacamund labelled by Mr. Moore *N. kurava* (this species being a synonym of *N. atrata* as stated by Mr. Moore himself), another male from Bholahât and another from Sikkim, labelled *N. atrata*, which agree in none of these characters with *N. atrata*, being in fact typical *N. prominens*. Lastly, I possess a pair of specimens from Ceylon labelled by Mr. Moore *N. prominens* which are really—following the above indicated characters—*N. atrata*. Mr. Moore may have inadvertently reversed these species in naming these specimens, though the name *prominens* would seem to refer to a species with very prominent bands, but *N. atrata* has them the more prominent of the two.

Accepting, as I must do, his descriptions in preference to his ticketed specimens, I find that I have examples before me of *N. atrata* from Bholahât in the Malda district, from Sikkim, Bhutan, Cachar, Ootacamund, Ceylon, and five male specimens from Singapore collected by Mr. W. Davison. This species is not included in Mr. Distant's "Rhopalocera Malayana."

726. **Nacaduba prominens**, Moore.

Lampides prominens, Moore, Ann. and Mag. of Nat. Hist., fourth series, vol. xx, p. 341 (1877); *Nacaduba prominens*, id., Lep. Cey., vol. i, p. 88, pl. xxxvii, figs. 3, *male*; 3*a*, 3*b*, *female*; 3*c*, *larvæ* and *pupa* (1881).

HABITAT: Bholahât in the Malda district, Sikkim, Bhutan, Cachar, Cherrapunji, Shillong, Orissa, North Canara, Ootacamund, Shevaroy Hills, Ceylon.

EXPANSE: ♂, ♀, 1·2 to 1·4 inches.

DESCRIPTION : " MALE. UPPERSIDE, *both wings* violet-blue, with very narrow indistinct brown marginal line. UNDERSIDE, *both wings* pale greyish-brown, crossed by five prominent dark-bordered white slightly-waved bands, an intermediate short band at the end of the cell, and two marginal blackish-interspaced bands, the inner one sinuous. *Hindwing* crossed by six broken white bands, two marginal blackish-interspaced sinuous bands, a large subanal and a small anal black spot, both silvery-speckled and ochreous-bordered. FEMALE. UPPERSIDE, *both wings* paler than in the male, the basal part brilliant greyish-blue. *Forewing* with the costal border and outer margin broadly black. *Hindwing* with the costal border broadly black, and a marginal row of black spots enclosed by a lunular line." UNDERSIDE as in the male.

"Allied to *L.* [=*N.*] *beroë*, Felder" [from Malacca and Luzon]. (*Moore*, l. c. in Ann. and Mag. of Nat. Hist.)

" LARVA onisciform ; pale rose colour, with dorsal and lateral rows of brighter spots. Feeds on the very young leaves of *Vateria indica*. PUPA somewhat cylindrical, head blunt ; reddish, with minute black spots." (*Moore*, l. c. in Lep. Cey.)

Thanks to the kindness of Messrs. Fairlie and Green, I have before me, as I write, very large series of both *N. prominens* and *N. atrata* from Ceylon. Following the characteristic differences given by Mr. Moore to define these two species, I have, with great difficulty, divided them into sets, the extremes of each being sufficiently distinct, but they gradually merge into one another and at the point of junction can hardly be separated. The blue coloration of the females on the upperside is very variable, some being almost white in some lights, some a little darker in shade, others again quite purple. I think further knowledge will make it clear that *N. atrata* is a variable species, and that it includes *N. prominens* as one extreme of its variations. I possess specimens of it from Bholahât, Sikkim, Bhutan, several places in Assam, from Orissa, North Canara, the Shevaroy Hills, and Ootacamund. In seven of these places *N. atrata* also occurs, a fact which should not be overlooked.

727. Nacaduba plumbeomicans, W.-M. and de N.

Lampides plumbeomicans, Wood-Mason and de Nicéville, Journ. A.S.B., vol xlix, pt. 2, p. 231, n. 41 (1880) ; *Nacaduba plumbeomicans*, Moore, Journ. Linn. Soc. Lond., Zoology, vol. xxi, p. 40 (1886) ; *Lampides plumbeomicans*, var. *nicobaricus*, Wood-Mason and de Nicéville, Journ. A. S. B., vol. l, pt. 2, p. 234, n. 35 (1881).

HABITAT : South Andaman and Nicobar Isles ; Mergui ; Chittagong Hill Tracts.

EXPANSE : ♂, 1·1 to 1·3 ; ♀, 1·16 to 1·25 inches.

DESCRIPTION : " Closely allied to *N. macrophthalma*, Felder, but much smaller ; with three instead of two fasciæ on the underside of the forewing, with all the fasciæ relatively broader, and with those of the hindwing much less complexly faulted and contorted. MALE. UPPERSIDE, *both wings* dark amethyst-purple, with a dull greyish leaden metallic lustre, with a deep black anteciliary line and fuscous *cilia*. UNDERSIDE, *both wings* pale fuscous of a purplish tinge, with a marginal and a submarginal fascia composed of suboval spots of a darker shade than the ground, both margined and connected by whitish, the latter of them bearing in the hindwing subanal and anal black spots in every respect as in *N. macrophthalma*, except that the luteous inner line is rather more distinct. *Forewing* with a basal fascia, a discocellular fasciole, and a discal fascia faulted as in *N. macrophthalma* at the second median nervule ; with the fasciæ as also the fasciole commencing at the costal nervure where they are all broken. *Hindwing* with corresponding fasciole and fasciæ, which latter are more or less faulted at every vein though much less contorted and consequently more easily traced than in *N. macrophthalma* ; fasciæ and fascioles of both wings margined on both sides with fuscous of a rather deeper shade than the ground and with whitish. FEMALE. UPPERSIDE, *both wings* dull smoky. *Forewing* with a pale discal patch which has a brilliant metallic pale bluish lustre in certain lights. *Hindwing* with a thin interrupted white line before the dark anteciliary one and a submarginal row of dark spots before it, spots and line increasing in size, breadth, and distinctness from the apical angle to the subanal region, the former obscurely encircled internally with smoky whitish. UNDERSIDE, *both wings* lighter, with all the markings more

pronounced, being margined with fuscous much darker than the ground and with pure white, and the marginal and submarginal macular fasciæ, especially conspicuous and coarse." *Wood-Mason* and *de Nicéville*, l. c.)

N. plumbeomicans comes into quite a different group from *N. macrophthalma*, from which it is of course abundantly distinct, having an extra fascia or rather two extra strigæ to the forewing on the underside, but it is very near to Ceylon specimens of *N. prominens*, Moore, from which it differs in its slightly paler coloration on the upperside in the male, rather broader forewing, the outer margin less oblique, the inner margin longer. The markings on the underside are precisely similar, being narrow and clearly defined, the edges of the whitish fasciæ not at all blurred. The female is less variable than that sex of *N. prominens,* the metallic blue patch on the upperside of the forewing being always small, while in *N. prominens* it varies very greatly in size.

N. plumbeomicans was taken by Dr. Anderson in considerable numbers in the Mergui Archipelago during the cold weather, there is a single male specimen from the Chittagong Hill Tracts in the Indian Museum, Calcutta, and in the Andamans it appears to be a common species.

Local race *nicobaricus.* "MALE. UNDERSIDE, *both wings* purplish slate-colour, the marginal and submarginal macular fasciæ more distinct, iron-grey, narrower, and separated by a wider space of the ground-colour from the discal fascia, in having all the fasciæ more sharply defined; and in having a very much larger subanal black spot, which is more broadly encircled with brighter orange, on the *hindwing,* than in *N. plumbeomicans.*" (*Wood-Mason* and *de Nicéville,* l. c., Journ. A. S. B., vol. l.)

This local race occurs on Kamorta and Katschall in the Nicobar Isles, and seems to be rare. I have only seen four specimens in all.

Two other species of this group occur in the Malay Peninsula, their descriptions will be found below.* Without specimens of them for comparison with the Indian species, it is quite impossible for me to give any distinguishing characters.

728. **Nacaduba cœlestis,** de N. (PLATE XXVII, FIG. 184 ♂).

N. cœlestis, de Nicéville, Journ. A. S. B., vol. lv, pt. 2, p. 366, n. 122, pl. xvii, fig. 11, *male* (1886); id., Doherty, l. c., p. 133, n. 173.

HABITAT: Jhulaghât, 2,000 feet, Kumaon; Sikkim; Cachar; Khasi Hills; Sibsagar, Upper Assam; South Andaman Isles.

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* *Nacaduba beroë,* Felder. *Lycæna beroë,* Felder, Reise Novara, Lep., vol. ii, p. 275, n. 340, pl. xxxiv, fig. 36, *male* (1865); *Lampides beroë,* Butler, Trans. Linn. Soc. Lond., Zoology, second series, vol. i, p. 547, n. 3 (1877); *Nacaduba beroë,* Distant, Rhop. Malay., p. 219, n. 2, pl. xx, figs. 17, *male*; 16, *female* (1884). HABITAT: Malacca (*Butler*); Luzon (*Felder*). EXPANSE: *Male* and *female,* 1·2 inches. DESCRIPTION: "MALE. UPPERSIDE, *both wings* of a leaden-violet tint, with a black-fuscous anteciliary streak. UNDERSIDE, *both wings* of a pale hoary-brown colour, with fuscous macular double fasciæ, margined with white, and closely touching one another along the margin of the wing. *Forewing* with the following fasciæ:—One subbasal almost touching the costa, then a subcostal spot, a short disco-cellular fascia, an exterior chain-like fascia broken at the second median nervule. *Hindwing* with a basal fascia, a disco-cellular fasciole, and an exterior fascia contiguous at the second median nervule, anteriorly twice strongly broken, and posteriorly broken, chain-like, of the colour of the ground, [all] laterally surrounded with fuscous and margined with white; also a posterior spot, which is orbicular, inwardly girt by a yellowish circle, outwardly divided by a delicate metallic bow, it has also a pair of minute black anal spots which have inwardly a narrow border of a metallic yellowish tint."

"Near to *L.* [=*N.*] *calauria,* Felder," from Amboina. (*Felder,* l. c. in Reise Novara.)

"This species seems to be very closely allied to *N. atrata,* Horsfield, and so again with the equally similar form described as *N. prominens,* Moore. Horsfield's species, however, appears to be distinct by the colour pattern of the wings of the female 'transmitting a white patch on the disc.'" (*Distant,* l. c.)

Nacaduba almora, Druce. *Cupido almora,* Druce, Proc. Zool. Soc. Lond., 1873, p. 349, n. 14, pl. xxxii, fig. 7, *male*; *Lampides almora?* Butler, Trans. Linn. Soc. Lond., Zoology, second series, vol. i, p. 547, n. 5 (1877); *Nacaduba almora?* Distant, Rhop. Malay., p. 220, n. 5, pl. xx, fig. 22, *male* (1884). HABITAT: Borneo (*Druce*), ? Malacca (*Butler* and *Distant*). EXPANSE: *Male,* 1·1 inches. DESCRIPTION: MALE. "UPPERSIDE, *both wings* pale brownish-blue. *Hindwing* with two black spots at the anal angle, with a narrow black line round the outer margin. UNDERSIDE, *both wings* very pale brown, streaked and mottled with white, black spots as above." (*Druce,* l. c.)

This description is absolutely wortbless, and till this species and others described by Mr. Druce are re-described, they will never be recognised. The figures are equally bad. On the single page where *N. almora* is described, five other "new species" are also described in from three to six lines apiece. Mr. Distant figures this species without tails;

EXPANSE: ♂, 1·00 to 1·15 inches.

DESCRIPTION: "MALE. UPPERSIDE, *both wings* shining bluish-purple, the outer margins somewhat widely black. *Hindwing* with a fine white anteciliary line from the anal angle to the first median nervule. UNDERSIDE, *both wings* dusky. *Forewing* with a subbasal straight fascia from the subcostal nervure to the inner margin darker than the ground-colour, and margined with white; a similar fascia from near the costa to the inner margin enclosing the disco-cellular nervules, and a series of five similar spots forming an outwardly-curved band from the costa to the second median nervule; a submarginal series of dusky spots outwardly narrowly and inwardly widely defined with white; an anteciliary fine white line. *Hindwing* with three indistinct basal spots, a subbasal straight band, another across the disc, coalescing with a shorter much curved one beyond, and enclosing a conspicuous small oblong white spot, marginal markings as in forewing, but with a round black spot beyond the origin of the tail, outwardly defined with silvery-blue scales and inwardly with an orange line, and with a few similar scales towards the anal angle. *Cilia* dusky, as is also the *tail*, the latter tipped with white." (*de Nicéville*, l. c.)

This species is quite unmistakable for any other known to me. It has a wide range, from Kumaon to Upper Assam, reappearing in the Andaman Isles. It is strange that out of the very numerous male specimens I have received there should be not one female; this is probably to be accounted for by the males having been captured near water, and in the open, while the females keep to the bushes and thick forest.

The figure shews both sides of a rather lightly-marked male specimen from Cachar now in the Indian Museum, Calcutta.

729. **Nacaduba bhutea**, de N.

N. bhutea, de Nicéville, Journ. A. S. B., vol. lii, pt. 2, p. 72, n. 10, pl. i, fig. 13, *male* (1883); id., Elwes, Trans. Ent. Soc. Lond., 1888, p. 387, n. 273.

HABITAT: Sikkim.

EXPANSE: ♂, 1·1 inches.

DESCRIPTION: "MALE. Differs from Sikkim specimens of *N. ardates*, Moore, in being larger, the band crossing the middle of the cell on the UNDERSIDE of the *forewing* in *N. ardates* not extending below it in *N. bhutea*, and the lower spot of the discal series well retired from the line of the five spots above it, whereas in *N. ardates* there are two lower spots out of line, one being additional."

"I took a single specimen on the Darjeeling cart-road between 2,000 and 5,000 feet elevation, in October, 1880, and numerous specimens have since been taken in Sikkim at low elevations. It seems a constant and well-marked species." (*de Nicéville*, l. c.)

"This species, though very close to *N. ardates*, may be distinguished without difficulty, if fresh specimens are compared. The best character is in the lower spots of the discal series on the forewing below, which form a bar right across the wing in *N. ardates*, and in *N. bhutea* are less in number, and do not reach the hind margin. De Nicéville says truly that the band crossing the middle of the cell on the forewing below does not extend below it in *N. bhutea*, and, though in *N. ardates* it usually does, yet I find some specimens in which this bar is variable in length."

"*N. bhutea* is not so common as *N. ardates*, and, like it, frequents wet sandy spots in the beds of rivers at 1-3,000 feet. I took it below Mongpo in June, and Möller gets it from April to October." (*Elwes*, l. c.)

In speaking of *N. ardates*, Moore, Mr. Butler notes on some specimens collected "near Assam" that "four damaged males were obtained, no two of them absolutely alike in the pattern on the underside of the forewing. A nearly allied 'species' described by de Nicéville, is separated from the above [*N. ardates*] by its superior size, by the abbreviation of the band crossing the cell [of the forewing] on the underside, and by the absence of the lowest spot in the discal series. The specimens before me vary from 22 to 24 millim. [= ·90 to ·95 of an inch] in expanse of wing; the band is only abbreviated in one of the larger specimens, and, though all have

the full number of sections to the discal band, the last two sections (they can hardly be called spots) are sometimes in line and sometimes decidedly out of line; the failure of the last spot of a discal series or the last section of a discal band is of frequent occurrence in the *Lycænidæ*; therefore, since both *N. ardates* and *N. bhutea* appear to be common in Sikkim, I feel some doubt as to the validity of the latter as a distinct species; at the same time, with only the figure of this form before me, I cannot positively assert that it is not distinct."

"I have, since the above was written, seen one imperfect specimen of *N. bhutea* in Mr. Moore's collection; I should certainly hesitate to describe so nearly-allied a form myself." (*Butler*, Ann. and Mag. of Nat. Hist., fifth series, vol. xvi, p. 335, n. 71 (1885).

With reference to Mr. Butler's remarks above, I have carefully examined the large series of specimens of the tailed and tailless forms of *N. ardates*, Moore, and of *N. bhutea*, mihi, captured in Sikkim, in the collection of Mr. Otto Möller. I find that the characters I gave as distinctive for the latter hold good: *N. bhutea* averages distinctly larger, the coloration of the upperside (not mentioned before) is darker, and the markings of the underside of the forewing are also less numerous, and neither Mr. Möller or I have any difficulty whatever in distinguishing between the two species. I may further add that before describing *N. bhutea*, I sent the type specimen to Mr. F. Moore for examination, and he gave it as his opinion that it was a "species distinct from *N. ardates*." The female of *N. bhutea* has still to be discovered. *N. bhutea* does not appear to have a tailless form.

A closely-allied species, if indeed distinguishable from *N. ardates*, Moore, has been described as below from the Malay Peninsula, Borneo, and the Philippines.*

730. **Nacaduba ardates**, Moore, (PLATE XXVII, FIG. 185 ♂, TAILLESS FORM).

Lycæna ardates, Moore, Proc. Zool. Soc. Lond., 1874, p. 574, pl. lxvii, fig. 1; *Nacaduba ardates*, Moore, Lep. Cey., vol. i, p. 90, pl. xxxviii, figs. 2, 2*a*, *male* (1881); idem, id., l. c., vol. iii, p. 530 (1887); id., de Nicéville, Journ. A. S. B., vol. liv, pt. 2, p. 3 (1885); id., Butler, Ann. and Mag. of Nat. Hist., fifth series, vol. xvi, p. 335, n. 71 (1885); id., Doherty, Journ. A. S. B., vol. lv, pt. 2, p. 133, n. 174 (1886).

HABITAT: Throughout India (except the desert tracts), the outer Himalayas, Ceylon, Burma, the Andaman and Philippine Isles.

EXPANSE: ♂, ·85 to 1·10; ♀, ·85 to 1·05 inches.

DESCRIPTION: "MALE. UPPERSIDE, *both wings* bluish-purple, exterior marginal line black. *Hindwing* with a short tail black. UNDERSIDE, *both wings* dark fawn-colour. *Forewing* with two pale-bordered brown spots within and one below the cell, an irregular discal series, and a submarginal row of dentate lunules. *Hindwing* with an irregular sub-basal and discal pale-bordered brown band, a submarginal row of dentate lunules and contiguous marginal spots, a prominent subanal round black spot speckled with metallic green scales. *Cilia* greyish, with dark inner line." (*Moore*, l. c. in Proc. Zool. Soc. Lond., 1874). "FEMALE. UPPERSIDE, *both wings* violet-brown. *Forewing* with lower medial area suffused with cobalt-blue. *Hindwing* with a marginal row of white-bordered indistinct black spots, the penultimate more distinct." UNDERSIDE, *both wings* as in the male. (*Moore*, l. c. in Lep. Cey., vol. 1, p. 90).

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* *Nacaduba aluta*, Druce. *Cupido aluta*, Druce, Proc. Zool. Soc. Lond., 1873, p. 349, n. 16, pl. xxxii, fig. 8, *male*; *Lampides aluta*, Butler, Trans. Linn. Soc. Lond., Zoology, second series, vol. i, p. 547, n. 4 (1877); *Nacaduba aluta*, Butler, Ann. and Mag. of Nat. Hist., fifth series, vol. xi, p. 417, n. 58 (1883); id., Distant, Rhop. Malay., p. 220, n. 4, pl. xx, figs. 14, *male*; 13, *female* (1884). HABITAT: Borneo (*Druce*), Sungei Ujong, Malacca (*Distant*), Mindanao, Philippines (*Butler*). EXPANSE: *Male*, 1·0; *female*, ·8 of an inch. DESCRIPTION: MALE. "UPPERSIDE, *both wings* dark lavender-blue, outer margins brown. UNDERSIDE, *both wings* pale brown, crossed by nine broken white lines; an orange spot at the anal angle, with a black centre." (*Druce*, l. c.) "FEMALE. UPPERSIDE, *both wings* fuscous-brown. *Forewing* with a discal patch of bluish scales, the outer margin darker. *Hindwing* with the posterior margin darker and inwardly margined with greyish, before which are a marginal row of dark spots placed between the nervules. *Cilia* brownish-ochraceous. UNDERSIDE, *both wings* somewhat bright ochraceous, with the markings as in the other sex, but with the marginal row of dark spots on the upperside of the *hindwing* distinct beneath; the black spot near the anal angle with a few scattered greenish scales." (*Distant*, l. c.)

"Nearly allied to *L.* [=*N.*] *nora* of Felder, from Amboina, but smaller, with less acuminate forewing." (*Butler*, l. c. in Trans. Linn. Soc.)

Mr. Druce's figure and description of the male of this species are absolutely useless; from Mr Distant's figures I judge that this species is indistinguishable from *N. ardates*, Moore, the latter being distinctly variable, especially in the colour of the ground on the underside.

"I took an aberrant male at Ranibagh, Kumaon. The transverse discal band of the underside is extremely broad on both wings, united with the disco-cellular streak. This aberration occurs in many *Lycænidæ*. I have a remarkable example of it in a specimen of *Nacaduba prominens*, Moore, from Bassein, Burma, and in one or two specimens of *Zizera maha*, Kollar, and *Z sangra*, Moore, in which the discal spots are all very elongate below. Similar though much rarer variations occur in the *Argynnis* and *Cynthia* groups, of which I have an example in an *Atella*. One or two species have been based on these curious monstrosities." (*Doherty*, l. c.)

"Mr. Distant in his recent work 'Rhopalocera Malayana' has divided the *Lycænidæ* into three groups, the first of which (*Curetaria*) lacks 'filamentous tail-like appendages' to the hindwing, while the other two groups (*Castalaria* and *Aphnaria*) possess these tails. This year [1884] I took many specimens of a lycænid in Sikkim in company with *N. ardates* which differed in no way from that species except in having no tails. On careful microscopic examination of these tailed and tailless forms, I can find no difference between them in respect of the venation; and as the markings are precisely similar, I conclude that they are one and the same species. Mr. Distant, in forming his three groups (p. 196), says that the presence or absence of the tail 'may prove to be an uncertain and illusory divisional character,' as an American naturalist [absolutely erroneously] has recorded that certain North American species have a tailless spring brood, and a summer tailed generation. In Sikkim, at any rate, both forms occur together, and in equal perfection as to condition. I have also received both forms from Orissa." (*de Nicéville*, l. c.)

"Mr. E. E. Green informs me, in a letter dated July 19th, 1886, that 'the tailless form of *N. ardates* differs distinctly in its habits from the tailed form, sporting about in large clouds round the Madras-thorn trees in Colombo. The specimens of *N. ardates* that I catch up-country are never seen but singly or in pairs, and have a more hesitating flight. In all my specimens the sinuous white lines on the underside are very much broader and more distinct than those of *N. ardates*. The female also differs in having a very much smaller area of blue on the forewing, in some specimens the colouring being confined to three or four blue scales only. *N. ardates* is on the wing, up-country, during most months of the year. I have only been in Colombo during the spring months, when I caught this tailless form, so that I am unable to speak positively of its period of flight.'" (*Moore*, Lep. Cey., vol. iii, p. 530).

"The tailless form [of *N. ardates*], which, in Orissa and the Eastern and Western Ghâts, is almost as common as the tailed, apparently does not occur in Kumaon." (*Doherty*, l. c.)

The above extracts are all that have been printed regarding the tailed and tailless forms of *N. ardates*. They occur together below Masuri, in Sikkim, at Bholahât in the Malda district, at Shillong, in Orissa, at Ootacamund, in the Shevaroy Hills, and in Ceylon, and from no locality have I received the tailless form without receiving the tailed also, though in many localities (the Bombay presidency, Burma, and the Andaman Isles) the tailed form alone appears to exist. Whether these two forms are really one or two distinct species can only be definitely settled by breeding. Mr. W. C. Taylor of Orissa, Mr. G. F. Hampson of Ootacamund, Mr. E. E. Green of Colombo, Ceylon, consider these forms to represent distinct species and probably genera; Mr. Doherty and I hold to the opposite view. Mr. Hampson writes me that the tailed and tailless forms appear indiscriminately throughout the year, and both swarm in the lower slopes of the Nilgiris. Colonel Lang also writes that "I have taken both tailed and tailless *N. ardates* flying together above bushes in September in several localities in Kumaon. Khairna on the Kosi, 3,100 feet, Bagheswar, 3,200 feet on the Sarju, and in the 'Great gorge' of the Sarju, 3,600 feet. I certainly regard them as constituting only one species."

N. ardates, tailed form, presents considerable variation in the colour of the ground on the underside, females especially being sometimes bright golden ochreous. In India it occurs almost everywhere except in the desert tracts of Sind, and in the inner ranges of the Himalayas. The type specimens were taken at Parl and Pooneh, Kashmir. I do not know

where these two places are, through Pooneh may be Poonch, which is a small State on the outer ranges bordering the plains. It has not been received by me from the Nicobar Isles, but occurs in the Andamans. If the *N. aluta* of Druce is, as I suspect, synonymous with *N. ardates*, then it occurs in the Malay peninsula and Borneo, and I have received the true *N. ardates* from the Philippines from Herr Georg Semper. It is the smallest and commonest species of the genus.

The figure shews both sides of a male of the tailless form from Sikkim in my collection.

731. Nacaduba dana, de N.

N. ? dana, de Nicéville, Journ. A. S. B., vol. lii, pt. 2, p. 73, n. 12, pl. i, fig. 15, *male* (1883); *N. dana*, Doherty, l. c., vol. lv, pt. 2, p. 133, n. 172 (1886); id., Hampson, l. c., vol. lvii, pt. 2, p. 358, n. 116 (1889).

HABITAT: Kumaon and the plains, up to 5,000 feet; Bholahât, Malda; Sikkim; Buxa, Bhutan; Chittagong district; Pegu Yoma, Myitta, Burma; Ootacamund, Nilgiris.

EXPANSE: ♂, ·95 to 1·05; ♀, 1·05 inches.

DESCRIPTION: "MALE. UPPERSIDE, *both wings* violet-blue, with the outer margins evenly narrowly black. UNDERSIDE, *both wings* fawn-coloured. *Forewing* with a white-bordered dusky spot in the middle of the cell, a similar one at its end, a discal chain of six similar spots, the two lower ones out of line, (in some specimens the sixth lowest spot is absent); submarginal and marginal indistinct series of pale lunules. *Hindwing* crossed by three much broken bands of white-bordered dusky spots, and submarginal and marginal lunules as in the forewing; two small black spots at the anal angle on the margin. *Cilia* dusky throughout. FEMALE. UPPERSIDE, *forewing* black, the disc whitish and covered with pale blue metallic scales, the disco-cellulars marked with a black spot. *Hindwing* dusky, with pale bluish-white streaks between the nervules, a black disco-cellular spot, and obscure marginal pale lunules. UNDERSIDE, *both wings* cream-coloured, the markings as in the male, but all the spots and bands (except the two black anal spots) pale ochreous."

"Two male specimens were taken in the Sikkim Terai in July and August, 1881, by Mr. Otto Möller, and four males from Bhurkhul and one from Demagiri in the Chittagong district were taken by Mr. H. M. Parish in February, 1883. All these specimens are very constant, showing no variation whatever. They present a superficial resemblance to *N. ardates*, Moore, but are a different colour on the upperside; they have also no tail, and should therefore probably be placed in a different genus.* Mr. Otto Möller has also obtained numerous males at low elevations in Sikkim during the summer and autumn, including the female described, Mr. W. H. Irvine has sent it from the Malda district, the Calcutta Museum collector took it at Buxa, and I took it in the Great Runjit valley, Sikkim, in October." (*de Nicéville*, l. c.)

"Not so common as *N. ardates*, Moore. It is quite different from the tailless *N. ardates* of Orissa, the hindwing being broad and truncate." (*Doherty*, l. c.) Occurs in Sikkim in June, October, November and December. Mr. Otto Möller possesses three female specimens, which differ somewhat in the extent of the bluish-white coloration of both wings on the upperside; in the prominence or otherwise of the markings, and in the shade of the ground-colour, on the underside.

Colonel Lang reports *N. dana* as "rare at Naini Tal, 5,500—6,500 feet, May; Kosi Valley, Kumaon, 3,200 feet, July; Ranibagh, plains, 1,000 feet, October." Mr. Hampson reports (l. c.) that it occurs commonly in the Nilgiri Hills from 2,000 to 4,000 feet elevation.

732. Nacaduba hampsonii, de N.

N. hampsonii, de Nicéville, Journ. A. S. B., vol. liv, pt. 2, p. 118, pl. ii, fig. 13, *male* (1885); *N. hampsoni*, Hampson, l. c., vol. lvii, pt. 2, p. 358, n. 117 (1888).

HABITAT: Dehra Dun; Ootacamund, Nilgiri Hills.

EXPANSE: ♂, 1·15 inches.

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* I have since examined the venation of this species, and as it does not differ in the smallest particular from that of *N. ardates*, Moore, I do not now think that it should be placed in a different genus.

DESCRIPTION: "MALE. UPPERSIDE, *both wings* deep shining violet-purple, the outer margins narrowly black. UNDERSIDE, *both wings* pale brown. *Forewing* tinged with ochreous on the inner margin extending into the disc, bearing the following blackish markings outwardly defined with white:—a quadrate spot across the middle of the cell with a small spot above it on the costa, a similar but larger one closing the cell, a discal curved chain of six spots (which is shifted inwards at the penultimate spot from the inner margin), and a double submarginal series of lunules. *Hindwing* marked with some indistinct spots at the base, then four subbasal ones extending across the wing, another closing the cell, and a much curved and irregular discal series; submarginal lunules as in the forewing, but bearing three black spots towards the anal angle, the outermost one largest and prominent, the others small; the usual anteciliary black line. *Cilia* pale brown, on the hindwing marked with dark brown at the ends of the nervules. No tail."

"Nearest to the tailless *N. dana*, de Nicéville, which also occurs at Ootacamund, but differing on the upperside in being of a different colour (deep violet-purple instead of light bluish-purple), and on the underside in having the markings throughout darker and more conspicuous, and the ground colour also darker. The forewing is also narrower and more produced at the apex." (*de Nicéville*, l. c.) "Male fairly common from 2,000 to 4,000 feet [in the Nilgiris], female unknown. The wet-season form has dusky markings on the underside similar to those of *N. macrophthalma*, Felder, but more variable in extent." (*Hampson*, l. c.)

This species has now been known some three or four years, but it has only been found in the Nilgiris and the Dehra Dun, and its female is still unknown. It is a very distinct and well-marked species. Mr. G. F. Hampson has taken it in considerable numbers on the southern slopes of the Nilgiris, and Mr. P. W. Mackinnon has sent me a single male taken in the Dehra Dun, Western Himalayas, on 29th August, 1888, and he informs me that he has only one other specimen.

The second subgroup has the first subcostal nervule of the forewing connected to the costal nervure by a short spur, a character which occurs in two Indian genera only, *Jamides*, Hübner, and *Lampides*, Hübner. Both these genera have a short filiform tail from the apex of the first median nervule of the hindwing. I can find no structural character whatever by which to separate them, but they are abundantly distinct in *facies*, the males of *Jamides* rivalling the magnificent South-American *Morphos* in the brilliance of the steel blue or purple coloration of the upperside, the forewing with a broad outer black border; the females are of quite a dull blue on the upperside; while in *Lampides* the differences between the sexes are not nearly so great, the females have a rather broader black border on the upperside than the males; the coloration of the upperside in one group of this genus is pale milky bluish-white, in the other azure-blue with a slight metallic lustre. Both genera are furnished with narrow more or less continuous white bands on the underside, the hindwing with the usual black spot on the margin in the first median interspace crowned with orange; the basal area of the forewing unmarked. The two genera occur almost throughout the Indo-Malayan region, and *Jamides* has been recorded from Australia. The males have no secondary sexual characters.

Genus 119.—JAMIDES, Hübner. (PLATE XXVII).

Jamides, Hübner, Verz. bek. Schmett., p. 71 (1816); id., Moore, Lep. Cey., vol. i, p. 86 (1881); id., Distant, Rhop. Malay., p. 222 (1884).

"FOREWING, elongate, triangular; *costa* slightly arched at the base, *apex* very [slightly] acute, *exterior margin* slightly oblique and convex, *posterior* margin long; *costal nervure* bent upwards near its end to the costa, extending to half length of the margin; *first subcostal nervule* short, emitted at nearly one-half before the end of the cell and slightly touching the costal nervure at its angle; *second* subcostal at one-third before the end of the cell; *third* subcostal close to the end; *fourth* subcostal at nearly one-half from the third and terminating at the apex; *fifth* subcostal from the end of the cell; *disco-cellular* nervules slightly waved, radial [*lower discoidal*] nervule from their middle; *discoidal cell* broad, long, extending to more than half the wing; *second median nervule* emitted at one-sixth before the end of the cell, *first* median at nearly one-half

before the end ; *submedian nervure* straight. HINDWING, short, triangular, with a slender *tail* from the end of the first median nervule ; *costal nervure* arched and extending to the apex ; *disco-cellular* nervules slightly oblique, *discoidal* nervule from their middle ; *discoidal cell* short, broad ; *second median nervule* emitted before the end of the cell, *first* median at nearly one-half before the end ; *submedian nervure* straight ; *internal* nervure recurved. BODY, slender, short ; *palpi* porrect, second joint projecting half length beyond the head, clothed with adpressed scales, third joint naked, slender, about half length of the second ; *legs* slender ; *antennæ* with a thick club ; " *eyes* hairy. (*Moore*, l. c.)

The costal nervure of the forewing is very short and ends on the margin considerably before the apex of the discoidal cell, the first subcostal nervule is of average length and is connected to the costal nervure by a short spur, the former is bent downwards at the point of union, the second subcostal arises quite close to the base of the first, the upper discoidal arises from the subcostal nervure quite three times as far from the base of the second subcostal as the latter does from the base of the first, the third subcostal arises about midway between the apex of the wing and the base of the upper discoidal ; upper disco-cellular slightly outwardly oblique, lower disco-cellular upright, distinctly longer than the upper. I can find no structural character of sufficient importance to put into words by which this genus can be separated from the next. On this subject Mr. Doherty writes " I am not aware of any difference between *Jamides* and *Lampides*, and think it likely that the former genus will have to fall before the latter, which occurs earlier in Hübner."

The genus *Jamides* contains I believe but a single species. It has a very wide range, occurring in India on the lower slopes of the outer ranges of the Himalayas, throughout continental and peninsular India except the dry North-West, in Assam, Burma, the Malay Peninsula and Archipelago, Ceylon, the Andaman and Nicobar Isles, in China, and in Australia. The male on the upperside of the hindwing and on the basal area of the forewing is most resplendent shining metallic steely-blue or purple, the costa, apex and outer margin of the forewing widely black, hindwing with a narrow black outer margin. Underside castaneous-brownish, crossed by narrow fine whitish lines, a large black spot surrounded by orange at the base of the tail. The female on the upperside has no metallic lustre, but is dull blue, with a series of bluish lunules on the hindwing along the rather broad outer black border. The transformations of the species are unknown, but Mr. E. E. Green informs me that in Ceylon he has observed the female butterfly laying eggs upon the pods of various *Leguminosæ*.

733. **Jamides bochus**, Cramer.

Papilio bochus, Cramer, Pap. Ex., vol. iv, p. 210, pl. cccxci, figs. C, D, *male* (1782) ; *Jamides bochus*, Hübner, Verz. bek. Schmett., p. 71, n. 702 (1816) ; id., Moore, Lep. Cey., vol. i, p. 86, pl. xxxvi, figs. 8, *male* ; 8a, *female* (1881) ; *J. bochus*, var., Distant, Rhop. Malay., p. 222, n. 1, pl. xxi, figs. 19, *male* ; 16, *female* (1884) ; *Polyommatus bochus*, Godart, Enc. Méth., vol. ix, p. 661, n. 150 (1823) ; *Lycæna bochus*, Staudinger, Ex. Schmett., p. 272, pl. xciv, *male* (1888), (*L. plato* on plate) ; *Hesperia plato*, Fabricius, Ent. Syst., vol. iii, pt. 1, p. 288, n. 103 (1793) ; *Papilio plato*, Donovan, Ins. Ind., pl. xlv, fig. 2 (1800) ; *Polyommatus plato*, Godart, Enc. Méth., vol. ix, p. 655, n. 127 (1823) ; id., Blanchard, Voy. Pôle Sud, vol. iv, p. 398, pl. iii, figs. 9, 10, ? *male* (1853) ; *Lampides plato*, Butler, Cat. Fab. Lep. B. M., p. 166, n. 18, pl. ii, fig. 3, *female* (1869) ; id., Semper, Journ. des Mus. Godef., vol. xiv, p. 156, n. 54 (1879) ; *Lycæna pluto*, Westwood, Gen. Diurn. Lep., vol. ii, p. 490, n. 42 (1852) ; *Hesperia democritus*, Fabricius, Ent. Syst., vol. iii, pt. 1, p. 285, n. 94 (1793) ; *Polyommatus democritus*, Godart, Enc. Méth., vol. ix, p. 656, n. 132 (1823) ; *Lampides democritus*, Butler, Cat. Fab. Lep. B. M., p. 166, n. 19 (1869) ; *Lycæna nila*, Horsfield, Cat. Lep. E. I. C., p. 78, n. 14 (1828) ; *Lampides plato*, var. *nicobaricus*, Wood-Mason and de Nicéville, Journ. A. S. B., vol. l, pt. 2, p. 234, n. 34 (1881).

HABITAT : India, Ceylon, Andaman and Nicobar Islands, Burma, Malay Peninsula, Sumatra, Java, Balaou, Formosa, Australia.

EXPANSE : ♂, ·9 to 1·35 ; ♀, 1·2 to 1·5 inches.

DESCRIPTION : "MALE. UPPERSIDE, *both wings* pure deep blue with a rich metallic lustre, changing, according to the light, to a brilliant sea-green. *Cilia* grayish-brown. *Forewing* with a broad black posterior border stretching towards the middle of the costa. *Hindwing* surrounded by an intensely black marginal thread ; near the anal angle, at the candal appendage,

a lunular-oblong black spot, bordered externally by an obscure white thread extending to the anal angle. UNDERSIDE, *both wings* yellowish-brown with a straw-coloured shade, and transversely marked, in the forewing with seven, and in the hindwing with nine very delicate yellowish strigæ covered with a faint golden lustre; three being marginal and continued through both wings. *Forewing* is further* marked, in the space comprised between the middle and the marginal series, with two pairs of strigæ, one short consisting of two lines parallel to each other immediately on the disc, the other extending across the whole surface in an angular curve, composed of short lines somewhat flexuose between the longitudinal nerves, with a sudden inflection on the disc, by which the posterior portion is directed towards the short pair; viewed together as arranged on the wing, these strigæ exhibit a figure somewhat resembling the letter Y. *Hindwing* bears also three pairs of strigæ; the first at a small distance from the base, the second in the middle stretching across the disc with a curve at the interior margin, the third posterior to this and terminated at the anal ocelli; they are individually composed of parallel interrupted portions; three ocellate spots are at the posterior margin near the anal angle; the exterior one large, nearly circular, abruptly terminated behind by a streak of silvery irrorations, and surrounded interiorly and at the sides with a narrow rufous iris; intermediate ocellus reniform, of the most intense tint on the lobe touching the extreme ocellus, which is larger and more distinct than in the related species [*Nacaduba pavana*, Horsfield]; the two last ocelli are united at their internal edge by a silvery lunule bordered with a rufous streak. *Tail* black tipt with white. *Antennæ* obscurely banded. *Body* blackish above, white underneath." (*Horsfield*, l. c.) "FEMALE. UPPERSIDE, *both wings* bright but non-metallic blue. *Forewing* with the costal and outer margins broadly (broadest at apex) blackish. *Hindwing* with the costal and abdominal margins fuscous, the posterior margin narrowly black, with two submarginal waved fuscous linear fasciæ, and a large marginal black spot inwardly bordered with bluish between the second and first median nervules. UNDERSIDE, *both wings* paler in hue, but marked as in the male." (*Distant*, l. c.)

As regards coloration, the male of this species is perhaps the most lovely of the Indian "blues," its brilliancy rivalling some of the South American species of *Morpho*. It is a common and widely distributed species, occurring all along the low outer valleys of the Himalayas, but not in the desert region of Sind, throughout continental and peninsular India, in Ceylon, the Andaman Isles, and on Kamorta, Nankowri, Katschall, Trinkutt, Teressa, and Great Nicobar Islands, in Assam, Burma, the Malay Peninsula, Java, Sumatra, Formosa, and Australia. In Ceylon Mr. Hutchison says that it "has a quick flight, darting from point to point among hedges on the roadside, and settling on the leaves." This I can confirm, in Calcutta it seems invariably to frequent trees and bushes, and always settles with closed wings. As it flashes past and suddenly settles on a leaf with its dull-coloured underside exposed, the disappearance of such a brilliant little object is somewhat startling.

There is a slight doubt in my mind regarding the identification of this species with Cramer's *bochus*, as in the figure of the underside he shews the forewing entirely unmarked, the hindwing with two black white-encircled anal spots only, none of the narrow white catenulated bands being given. As however the coloration of the upperside is very characteristic, and Cramer records the butterfly from Ceylon, where no other species occurs which will fit the figures better, I feel nearly sure that he intended to portray the species under discussion.

Local race *nicobaricus*, Wood-Mason and de Nicéville. (PLATE XXVII, FIG. 186 ♂).

DESCRIPTION: "MALE. UPPERSIDE differs from specimens of the same sex from Calcutta, Sikkim, South India, Ceylon, and Bombay in the greater extent of the blue on the *forewing*, the broad black outer border of which does not stretch back towards the middle of the costa in the manner described by Horsfield." (*Wood-Mason* and *de Nicéville*, l. c., Journ. A. S. B., vol. l.)

* In this case "further" does not mean that there are additional markings to those just mentioned above by the writer, but that he now proceeds to give further details regarding them.

This local race, occurring on the Andaman and Nicobar Isles, appears to be well-marked and easily distinguished in the male by the outer black border of the forewing being of nearly equal breadth throughout and not extending along the costa as it does in Indian specimens. The female, however, is quite similar. Mr. Distant, writing of a Malay peninsular (Province Wellesley) specimen, notes: "This is a variable species, especially in the male sex. The male specimen here described and figured differs from the typical form of the species in the greater amount of melanism, or increase of the black coloration to the forewing; whilst the variety *nicobaricus* varies contrariwise by the greater extent of the blue area. Only one male specimen having been collected, it will remain to be discovered whether this varietal male form is of a constant or local character in the Malay Peninsula, as the females are indistinguishable from Ceylonese examples." Judging from a large series of specimens, the Andaman and Nicobar race would appear to be very constant; but this is not the case with specimens from various parts of India, where in some specimens of both sexes the blue area of the upperside is twice as extensive as it is in others, these variations being no doubt largely due to seasonal causes, the specimens with the greatest amount of black being found during the rains.

The figure shows both sides of a male specimen of the local race *nicobaricus* from the Nicobar Isles in the collection of the Indian Museum, Calcutta.

Genus 120.—LAMPIDES, Hübner. (FRONTISPIECE).

Lampides, Hübner, Verz. bek. Schmett., p. 70 (1816); id., Moore, Lep. Cey., vol. i, p. 94 (1881); id., Distant, Rhop. Malay., p. 226 (1884).

"FOREWING, somewhat broad, nearly triangular; *costa* arched, *exterior margin* slightly oblique and convex, *posterior* margin-acute [*sic*]; *costal nervure* short, curved, bent upwards to the costa near its end; *first subcostal nervule* bent upwards and joined to the costal nervure by a short spur, emitted at one-half before the end of the discoidal cell, *second* subcostal at one-third, *third* subcostal at one-eighth before the end, *fourth* subcostal at one-half from the third and terminating at the apex, *fifth* subcostal [upper discoidal] from the end of the cell; [*middle* and *lower*] *disco-cellular* nervules curved, *lower discoidal* from their middle; *discoidal cell* broad; *third median nervule* emitted at one-eighth before the end of the cell, *first* median at one-half before the end; *submedian nervure* straight. HINDWING, somewhat broad, triangularly-oval, *apex* convexly-angular, *exterior margin* very oblique, slightly angled at the end of the first median nervule, and a slender *tail* extending from the angle; *abdominal* margin long; *costal nervure* much arched at base, extending to apex; *first subcostal nervule* emitted at one-fifth before the end of the cell; *disco-cellular* nervules outwardly oblique, *discoidal* nervule from their middle; *discoidal cell* broad; *third* and *second median nervules* emitted from the end of the cell; *first* median at nearly one-half before the end; *submedian* and *internal nervures* straight. BODY slender, short; *palpi* porrect, second joint projecting about half its length beyond the head, clothed with long adpressed scales, third joint very long, slender, naked; *legs* slender; *antennæ* with a lengthened grooved pointed club; *eyes* hairy. Type *L. ælianus*, Fabricius." (*Moore*, l. c.)

In the forewing the costal nervure is very short, terminating on the margin before the apex of the discoidal cell; the short spur joining the first subcostal nervule to the costal nervure is a feature present in *Jamides*, Moore; the base of the second subcostal is about half as near to the base of the first subcostal as it is to the base of the upper discoidal; the third subcostal is emitted about midway between the base of the upper discoidal and the apex of the wing; the disco-cellular nervules are nearly upright, slightly concave, the middle one rather shorter than the lower; the second median nervule emitted some distance before the end of the cell. In the hindwing the first subcostal nervule is emitted rather near to the apex of the cell, the second median nervule given off just before its lower end. Structurally this genus hardly differs from *Jamides*, Hübner, and what differences there are are so slight that they can hardly be expressed; but the style of coloration and markings will easily distinguish them.

The transformations of two species are known. The larva is of the usual lycænid shape, colour dull reddish-green, with a dorsal and a lateral darker line on each side. Pupa of the usual form, brown, spotted and marked with darker.

Lampides appears to be a purely tropical and subtropical oriental genus, occurring almost throughout India, in Ceylon, the Andaman and Nicobar Isles, Burma, and the Malay peninsula and islands, but, unlike *Nacaduba, Jamides,* and *Catochrysops,* has not been recorded from Australia. There is a great similarity in the markings of all the species of the genus: the upperside of the male is either metallic azure-blue or bluish-white* (thus enabling one to divide them into two groups), with a more or less wide outer black margin, which is reduced to an anteciliary thread on the hindwing; the females are paler blue, with the black border to the forewing very broad, broad on the hindwing also, enclosing a series of lunules of the ground-colour. The markings of the underside in both groups are much the same, three marginal white lines being common to both wings, the forewing having four, the hindwing six similar lines across the disc. The arrangement of these markings and the details of the ocelli near the anal angle of the hindwing afford excellent specific distinctions.

On the underside of the forewing, the four discal striæ form good characters by which to distinguish the different species, and hence may be designated the "characteristic" striæ: the one nearest the base being distinguished as no. 1, and that nearest the exterior margin as no. 4. These lines are sometimes continuous and carried in a gentle curve partly or wholly across the wing transversely from the costa to the interior margin: sometimes they are broken up into fragments more or less out of line: sometimes they are completely dislocated and the lower fragments shifted completely out of line. The two original species, *L. elpis,* Godart, and *L. ælianus,* Fabricius, are clearly distinguished by these striæ.

In *L. elpis* the four striæ are quite distinct from one another and more or less parallel: nos. 1 and 2 are long and parallel, arising at some distance from the costa and nearly reaching the inner margin: nos. 3 and 4 are short, arising close to the costa and ending on the second and third median nervules respectively.

In *L. ælianus* all four striæ arise close to the costa, and in this case nos. 1 and 3 are the long and nos. 2 and 4 the short striæ: the long striæ being subject to dislocation of their lower portions, which may thus appear to form the lower straight strokes of one or two Ys. This is fully described under the species.

L. coruscans, Moore, *L. kondulana,* Felder, and *L. kankena,* Felder, form a group with the striæ arranged as, or nearly as, in *L. elpis:* and may be distinguished by the absence of Ys.

L. ælianus, Fabricius, presents either two Ys, one Y formed of striæ nos. 1 and 2, or one Y intermediate between nos. 1 and 4 striæ, in some cases having no Ys; but in this case the long striæ are nos. 1 and 3, in *L. elpis* the long striæ are nos. 1 and 2.

L. pura, Moore, and *L. pseudelpis,* Butler, present a medial Y between striæ nos. 1 and 4.

L. subdita, Moore, and *L. kinkurka,* Felder, present a basal Y formed of striæ nos. 1 and 2.

The great difficulty there is in identifying the species of this genus has led to the following remark by Mr. Doherty:—"It is to be hoped that no more species of this genus will be described without an examination of the prehensores of the males, which are fortunately of great diversity in the different kinds, as if to counterbalance their puzzling similarity in colour and markings."

In India, where, as a rule, the climate may be divided into two well-marked divisions, a dry and a wet, much seasonal dimorphism obtains in the typical species of each group. In the dry-season broods of *L. elpis,* this takes the form of the metallic azure colour of the upperside of the male being of a paler shade; of the marginal black markings of the upperside of the hindwing of the female being much less prominent, and often, indeed, more or less obsolete; and of a pale ferruginous shade being substituted, with concomitant blurring of the white markings, for a plumbeous one in the ground-colour of the underside of both sexes. The seasonal changes in *L. ælianus* are of even greater extent and distinctness. If the dry-season

* *L. marakata,* Doherty, MS., is an exception to this almost universal style of coloration, the male being light green on the upperside, *vide* description on page 174.

be compared with the wet-season broods, it will be seen that in the former, on the upperside of the female, the outer black border of the forewing is half the width, and the black markings on the hindwing are very much reduced; both sexes have the underside extremely variable and more or less variegated in coloration and markings, the white lines often forming edgings for very well-defined and distinct broad dark bands; the anal ocelli of the hindwing are reduced or obsolete; and the orange lunule crowning the large subanal ocellus is very small or altogether wanting.

Wherever they are met with, the species of *Lampides* are common, and very conspicuous on the wing. They affect trees and bushes, and appear to prefer "checkered shade" to the open glare of the sun. The larvæ and pupæ are of the usual lycænid shape, having nothing distinctive about them.

Key to the Indian species of Lampides.

A. Males, upperside, both wings metallic azure-blue.

a. Both sexes, underside, forewing with the four discal white striæ parallel; fourth stria from base ending on third median nervule.

*a*¹. Male, upperside, both wings light metallic azure-blue.

734. L. ELPIS, Eastern and Southern India, Ceylon, Andamans, Burma, Malay peninsula and islands.

*b*¹. Male, upperside, both wings dark metallic azure-blue.

735. L. CORUSCANS, Ceylon, Chittagong Hill Tracts, Burma, Singapore, Nicobars.

b. Both sexes, underside, forewing with the four discal white striæ not parallel; fourth stria from base ending on second median nervule.

*a*¹. Second and third striæ from base forming a Y; inner of the three marginal white lines on underside of hindwing slightly lunular, not enclosing dark spots; orange lunule to subanal ocellus moderate or small.

736. L. PSEUDELPIS, Ceylon, Malay peninsula and islands.

*b*¹. First and second striæ from base forming a Y; inner of the three marginal white lines on underside of hindwing highly lunular, enclosing fuscous spots; orange lunule to subanal ocellus very large.

737. L. SUBDITA, Burma.

B. Males, upperside, both wings pale bluish milky-white.

a. Both sexes, underside, forewing with fourth white stria from base ending on second median nervule; some of the striæ usually forming Ys.

*a*¹. Males, upperside, forewing with no submarginal dusky fascia.

*a*². Male with more or less broad outer black margin to forewing on upperside.

738. L. ÆLIANUS, India, Ceylon, Andamans, Burma, Malay peninsula, Siam, Malay archipelago.

*b*². Male with fine black marginal thread only to forewing on upperside.

739. L. PURA, Assam, Chittagong Hill Tracts, Mergui.

*b*¹. Male, upperside, forewing with a submarginal dusky fascia.

740. L. KINKURKA, Nicobars.

b. Both sexes, underside, forewing with fourth white stria from base ending on third median nervule; all the striæ parallel.

*a*¹. Male, upperside, forewing with diffused fuscous striolæ before the margin, outwardly resting on an obsolete white line.

741. L. KONDULANA, Nicobars.

*b*¹. Male, upperside, forewing with no fuscous striolæ before the margin.

742. L. KANKENA, Nicobars.

734. Lampides elpis, Godart.

Polyommatus elpis, Godart, Enc. Méth., vol. ix, p. 654, n. 125 (1823); *Lycæna elpis*, Horsfield, Cat. Lep. E. I. C., p. 76, n. 11, pl. i, fig. 4, *male* (1828); pl. iv, figs. 1*b-e*, *structure of imago* (1829); id., Horsfield and Moore, Cat. Lep. Mus. E. I. C., vol. i, p. 24, n. 18 (1857); id., Snellen, Tijds. voor Ent., vol. xix, p. 152, n. 44 (1876); *Lampides elpis*, Moore, Proc. Zool. Soc. Lond., 1878, p. 833; id., de Nicéville, Journ. A. S. B., vol. l, pt. 2, p. 52, n. 44 (1881); idem, id., Notes on Indian Insect Pests, vol. i, p. 11, pl. i, figs. 5*a*, *male*; 5*b*, *larva* (1889); id., Moore, Lep. Cey., vol. i, p. 95, pl. xxxviii, figs. 4, *male*; 4*a*, *female* (1881); id., Distant, Rhop. Malay., p. 226, n. 1, pl. xxi, figs. 25, *male*; 26, *female* (1884); id., Butler, Ann. and Mag. of Nat. Hist., fifth series, vol. xvi, p. 335, n. 72 (1885).

HABITAT: Malda, Sikkim, Calcutta, Assam, Orissa, Bangalore, Calicut, Nilgiris, Wynaad, Travancore, Ceylon, Andaman Isles, Burma, Malay peninsula, Java, Borneo, Philippines.

EXPANSE: ♂, ♀, 1·2 to 1·8 inches.

Wet-season form.

DESCRIPTION: "MALE. UPPERSIDE, *both wings* pale azure with a silvery somewhat lactescent gloss. *Forewing* with a narrow blackish-brown posterior [outer] margin. *Hind wing* with a broader border of the same colour, consisting of three parallel strigæ, one exterior narrow and continued; the second intermediate, composed of a series of oblong spots more intensely coloured towards the anal angle; the third and interior one broad, waving and evanescent. [These three strigæ are very marked in some specimens, entirely absent, except the outermost one, in others from the same locality.] UNDERSIDE, *both wings* grayish-brown, and in well-preserved individuals the tint is deeper, and a rich silvery reflexion is spread over it. Forewing with seven, hindwing with nine white strigæ, three of which are marginal and agree with those of the two former species [*L. ælianus*, Fabricius, and *L. celerio*, Fabricius.] *Forewing* with four white strigæ arranged in two pairs on the medial and submarginal portions of the wing; the strigæ of the interior pair are continued, they arise, parallel to each other, at a small distance from the costa, pass in a somewhat angular curve across the disc, and come in contact with the interior margin near the inner one of the marginal strigæ: the next pair consists of interrupted short linear fragments, arises from the costa, having near its point of contact two or three small lateral dots, stretches half across the wing, and is terminated on the disc by a short lineola, disposed intermediately between the two or along the interior striga. The arrangement of these strigæ is permanent and affords clear characters for a specific distinction. *Hindwing* marked between the base and the margin with six transverse strigæ, agreeing generally with those of *L. ælianus* and *L. celerio*, the only apparent difference is that they are somewhat broken and interrupted in their course. The anal ocelli are not in any degree different from those in *L. celerio*. The *thorax* and anterior part of the *abdomen* are covered with a grayish or light blue and silvery down: the sides of the abdomen, and the *antennæ* are annulated. Our collection contains one specimen of a variety on which a pure azure extends uniformly over the upperside. FEMALE. UPPERSIDE, *both wings* have the azure tint [of the male] somewhat diluted. *Forewing* has a very broad dark brown posterior border, stretching obliquely to the middle of the costa. *Hindwing*, the border has a blackish tint, and the oblong spots of the intermediate series are encircled with white." UNDERSIDE, *both wings* like the male. (*Horsfield*, l. c.)

The above minute and excellent diagnosis was made by Dr. Horsfield from Javan specimens, and applies exactly to the species as it exists in India, but it may be noted with regard to the males that the three parallel strigæ on the upperside of the hindwing appear in some specimens only, in others are more or less absent, in others again quite obsolete, and that all forms occur in the same locality; but whether this variability is due to seasonal causes or not I am unable to say.

Dry-season form.

DESCRIPTION: MALE and FEMALE. UPPERSIDE, *both wings* with the blue colour paler. UNDERSIDE, *both wings* differ in the ground-colour, which, instead of being "grayish-brown," almost plumbeous, as in the wet-season form, is of a pale ferruginous colour which suffuses all the white markings, imparting to them a blurred and indistinct appearance. This form probably occurs everywhere where there are two well-marked seasons, a dry and a wet; I possess specimens from Malda, Sikkim, Calcutta, Orissa, and several parts of Assam. Seeing how *L. ælianus* has been split up, and its local, varietal, and seasonal forms described as distinct species, I am surprised that the dry-season form of *L. elpis*, which is quite as distinct as many named forms of *L. ælianus*, has so far remained undescribed.

"LARVA dull pale green, tinged with red on dorsal area; three reddish narrow dorsal stripes [one dorsal, two lateral]; spiracles minute, black; head small, brown, retracted beneath the second segment; length when full-fed ·55 of an inch. Feeds in Ceylon on the fruit of the cardamom, *Elettaria cardamomum*. PUPA smooth, pale dull yellowish-brown, marbled and spotted with dark brown, spots coalescing into three irregular dorsal stripes." (*E. E. Green* in litt.) As the cardamom only grows, I believe, in South India and Ceylon, the larva of *L. elpis* must have other food-plants throughout its wide range where the cardamom is not found. Mr. Green found only one larva, and says that he did not notice that it was furnished with the special organs affected by ants.

L. elpis is usually a much rarer species than *L. ælianus*; but both occur about equally commonly in Sikkim, which may, perhaps, be exceptional in this respect. It has a rather more restricted range also than its congener, not occurring at all in the Bombay district or in the Deccan. It presents a curious appearance on the wing, as, on account of its alternately completely opening and shutting its wings in flight, the contrast between the brilliant metallic-blue of the upper surface and the dark dull underside is very striking. Mr. Butler notes that "Indian examples are slightly more azure in tint than those from Java, but do not otherwise differ." However, as above pointed out, Indian specimens do often differ from those described by Dr. Horsfield in the entire absence or presence of the second and third marginal strigæ on the upperside of the hindwing in the males.

Mr. Distant has figured (without tails), but not described, what is probally the wet-season form of this species in his "Rhopalocera Malayana," pl. xxi, fig. 24, *male*, while his figure 25 seems to represent a male of the dry-season form.

735. **Lampides coruscans**, Moore.

L. coruscans, Moore, Ann. and Mag. of Nat. Hist., fourth series, vol. xx, p. 341 (1877); idem, id., Lep. Cey., vol. i, p. 96, pl. xxxvi, figs. 9, 9*b*, *male*; 9*a*, *female* (1881).

HABITAT: Ceylon, Chittagong Hill Tracts, Burma, Nicobar Isles, Singapore.

EXPANSE: ♂, ♀, 1·2 inches.

DESCRIPTION: "MALE. UPPERSIDE, *both wings* brilliant glistening cobalt-blue. *Forewing* with a very narrow black speckle-bordered marginal band. *Hindwing* with a narrow black marginal line and speckled black spots. *Cilia* black, with whitish outer edge on the forewing, and inner white line on the hindwing. UNDERSIDE, *both wings* pale leaden-grey. *Forewing* with two narrow white transverse discal lines, a short upper intermediate streak, a short outer line, a double marginal row of white dentate marks with blackish intermediate space, and marginal line. *Hindwing* with several interrupted narrow white transverse lines, a submarginal prominent double dentate line with black intermediate space, and marginal line; a large subanal ochreous-bordered black spot. FEMALE. UPPERSIDE, *both wings* greyish-blue. *Forewing* with a black outer band, which is confined to the apex and outer margin. *Hindwing* with a blackish anterior border, and a submarginal dentate band enclosing a marginal row of black spots." UNDERSIDE, *both wings* like the male.

"Allied to *L. pluto* [=*Jamides bochus*, Cramer], but of a less glittering colour on the upperside, and without the broad black band in the male." (*Moore*, l. c. in Ann. and Mag. of Nat. Hist.)

Mr. Moore's figure of this species shows on the underside of the forewing a short white line across the middle of the cell, a discal line from the subcostal to the submedian nervure, another line beyond approaching the costa somewhat more closely than the last, and a fourth shorter indistinct subapical line, all these lines parallel to one another. This arrangment does not agree with any species of the group known to me. I identify this species by its deeper coloration more approaching that of *Jamides bochus*, and by its smaller size, specimens agreeing with these characters occurring in Ceylon with *L. elpis*, Godart. The characteristic striæ of *L. coruscans* are arranged generally as in *L. elpis*, nos. 1 and 2 from the base arising at a distance from the costa, curving parallel to one another across the disc to the inner margin; nos. 3 and 4 arising on, or close to, the costa and extending to the third median nervule, where there is a short fragment reaching the second median nervule, common to

the pair, and forming the lower stroke of the Y of which they are the upper arms. Thus, *L. coruscans* appears to be a form of *L. elpis* in which the tint of the upper surface is decidedly deep azure-blue, and which is, moreover, of a smaller size. I possess a male specimen of this species from Ceylon, one from the Chittagong Hill Tracts, two from Teressa (one of the Nicobar Isles), and one from Singapore. It may be that these specimens represent a form not really specifically distinct from *L. elpis*, but the species may be retained as such at present, pending the results of further local research and experience.

In Ceylon *L. coruscans* is "Plentiful in the Kottawa forest, Galle. Easy to capture" (*Wade*). "Western and Southern Provinces. Plains, in forest land; during S.-W. monsoon, fluttering about bushes in open glades of the forest; not common" (*Hutchison*).

In the Phayre Museum, Rangoon, is a single male from Palone, in Burma, taken in January, which measures a good deal more than the above-noted specimens; it also differs in its still darker tone of colour on the upperside, and the black margin is considerably diffused over the apex and outer margin of the wing.

Mr. Distant records *L. kankena*, Felder, from the Malay peninsula and Borneo, and places the *Cupido cærulea* of Druce as a synonym of that species. The original description of the latter species is so inadequate and the figure is so obviously incorrect that without reference to the type specimen it is impossible to exactly determine the species. It appears probable, however, that it is very near to or perhaps synonymous with *L. coruscans*, Moore; in the latter case *L. cærulea* would have priority. But Mr. Distant must be mistaken in saying that *L. kankena* and *L. cærulea* are one species, and that the former occurs in the Malay peninsula, as Dr. Felder describes *L. kankena* as "Male. Upperside pale silvery-blue," *i. e.*, of the *ælianus* group Mr. Distant decribes it as "Male. Upperside dark, shining, azure-blue," *i. e.*, of the *elpis* group, and apparently of the exact shade of *L. coruscans*. There can be hardly any doubt that Mr. Distant has wrongly identified this species, more especially as he does not record the true *L. coruscans* from the Malay Peninsula, where it undoubtedly occurs. Mr. Butler records *L. cærulea* from Ceylon, no doubt quite correctly. I give below Mr. Distant's description of it with its synonomy as set down by him, and also Mr. Druce's description of *L. cærulea*.*

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* *Lampides kankena*, Distant, Rhop. Malay., p. 229, n. 3, pl. xx, figs. 18, *male*; 11, *female* (1884); *Lycæna kankena*, Felder, Verh. zool.-bot. Gesellsch. Wien, vol. xii, p. 481, n. 106 (1862); idem, id., Reise Novara, Lep., vol. ii, p. 270, n. 331, pl. xxxiv, fig. 37, *male* (1865); *Lampides kankena*, Moore, Proc. Zool. Soc. Lond., 1877, p. 588; id., Wood-Mason and de Nicéville, Journ. A. S. B., vol. l, pt. 2, p. 235, n. 38 (1881); *L. kankena?* Butler, Trans. Linn Soc. Lond., Zoology, second series, vol. i, p. 547, n. 10 (1877); *Cupido cærulca*, Druce, Proc. Zool. Soc. Lond., 1873, p. 349, n 13. pl. xxxii, fig. 6, *male*; *Lampides cærulea*, Butler, Trans. Linn. Soc. Lond., Zoology, second series, vol. i, p. 547, n. 7 (1877). HABITAT: Kar Nicobar (*Feldcr*), Sungei Ujong (*Distant*), Malacca (*Butler* and *Distant*), Singapore (*Distant*), Ceylon (*Butler*), Borneo (*Druce* and *Butler*). EXPANSE: *Male* and *female*, 1·0 to 1·3 inches. DESCRIPTION: "MALE. UPPERSIDE, *both wings* dark, sbining, azure-blue. *Forewing* with the costal margin narrowly, and the outer margin (especially at apex) rather more broadly blackish. *Hindwing* with the outer margin narrowly blackisb, and with two transverse black lines outwardly margined with wbitish at the anal angle; tail-like appendage black, with the apex white. UNDERSIDE, *both wings* dark greyish-brown, witb a plumbeous tinge, and crossed by the following greyish-white linear fasciæ arranged in pairs:—*forewing* with two crossing the end of the cell and then dislocated and extending to the inner margin, followed by two, likewise dislocated, commencing near the costa, and terminating at the third median nervule, continued by a short, single intermediate one reaching tbe second median nervule, two submarginal and one marginal: *hindwing* with three pairs more or less dislocated, two waved submarginal and one marginal; a large black marginal spot containing a few scattered bluish scales, and inwardly broadly surrounded with ochraceous, situated between the second and first median nervules, and at anal angle a black transverse angulated streak, margined with greyish-white, and inwardly bordered by a few bluish scales and a small ochreous spot. *Body* above with the thorax more or less concolorous with the wings, the abdomen greyish-brown, with the lateral segmental incisures greyish-white; body beneath greyisb-white. *Legs* fuscous, more or less annulated with greyish, the femora wholly greyish beneath. FEMALE. UPPERSIDE, *both wings* with the blue coloration less resplendent. *Forewing* with the apex and outer margin more broadly blackish. *Hindwing* with a marginal row of blackish spots bordered with greyish, placed between the nervules, that at the anal angle transversely linear and angulated UNDERSIDE, *both wings* as in the male, the ochraceous margining of the subanal spot larger and more diffused." (*Distant*, l. c.)

Lampides (*Cupido*) *cærulea*, Druce, Proc. Zool. Soc. Lond., 1873, p. 349, n. 13, pl. xxxii, fig. 6, *male*. HABITAT: Borneo (*Druce*), Ceylon (*Butler*). EXPANSE: *Male*, 1·2 inches. DESCRIPTION: "MALE. UPPERSIDE, *both wings* bright morpho-blue, with the outer margins bordered with black; two minute black lines at the anal angle. UNDERSIDE, *both wings* pale brown, crossed by four whitish lines from the costal margin to the anal angle. *Hindwing* with a large orange spot at the anal angle, with a black spot in the centre." (*Druce*, l. c.)

I have hardly any doubt in my own mind that the *cærulea* of Druce, tbe *coruscans* of Moore, and the *kankena* of Distant (but not of Felder) represent but one species, which should be known by the first mentioned name, but until someone makes an actual comparison between the type specimens of all these species, the matter must remain in doubt.

736. **Lampides pseudelpis,** Butler.

L. pseudelpis, Butler, Trans. Linn. Soc. Lond., Zoology, second series, vol. i, p. 547, n. 9, pl. lxviii, figs. 9, *male*; 8, *female* (1877); id., Moore, Lep. Cey., vol. i, p. 95 (1881); *L. elpis*, var. *pseudelpis*, Distant, Rhop. Malay., p. 227, pl. xx, figs. 27, *male*; 28, *female* (1884).

HABITAT: Ceylon, Malacca, Java, Bantam.

EXPANSE: ♂, ♀, 1·5 inches.

DESCRIPTION: "Nearly allied to *L. elpis*, Godart, which it resembles above. MALE. UPPERSIDE, *both wings* more distinctly bluish-opaline. UNDERSIDE, *both wings* with the white transverse bands narrower, irregular and broken up. *Hindwing* with the large submarginal black spot less broadly encircled by ochreous." (*Butler*, l. c.)

"MALE. UPPERSIDE, *both wings* of a paler colour than in *L. elpis*, with a black marginal line. *Hindwing* with a whit einner marginal line only, no submarginal spots. UNDERSIDE, *both wings* with the bands narrower, more irregular and broken, the two marginal bands more sinuous, the anal black spot larger and less broadly bordered with ochreous." (*Moore*, l. c.)

"I cannot look upon this proposed species as exhibiting anything but a varietal character or form of *L. elpis*." (*Distant*, l. c.)

Mr. Distant also points out that Mr. Butler's figures of the species are inexact in some respects, as the female should exhibit a fuscous costal margin on the upperside of the forewing, whilst the ground-colour of the wings is too green in hue. Moreover, no tail to the hindwing is shown.

It is of course impossible to distinguish *L. pseudelpis*, Butler, from *L. elpis*, Godart, by the inexact figures and very insufficient diagnosis given by Mr. Butler. When new species are established on minute differences from already described species, it is of course imperatively necessary that minute specifications should be furnished: and the descriptions (*e. g.*) given by Dr. Horsfield for *L. ælianus*, Fabricius, *L. celerio*, Fabricius, and *L. elpis*, Godart, afford excellent models in this respect. Dr. Horsfield has pointed out that the arrangement of the four discal transverse white striæ on the underside of the forewing "affords clear characters for a specific distinction;" also that "the species can only be clearly discriminated by the markings of the underside of the forewing, on which the specific character will eventually be founded," and it is chiefly to these characters that we must look for establishing a distinction between *L. pseudelpis* and *L. elpis*, as between other closely allied forms in this group.

The species as described by Mr. Butler and identified by Mr. Moore appears to occur typically in Ceylon, where however it appears with *L. elpis*, *L. ælianus*, and *L. coruscans*, and may have originated in hybridation. I have before me five males and three females from Ceylon, which on the upperside are probably indistinguishable from many specimens of typical *L. elpis*; but on the underside the characters above-mentioned furnish means of distinguishing the one from the other. Confining attention to the four discal striæ of the forewing, and designating them as nos. 1, 2, 3 and 4—no. 1 being nearest to the base of the wing—it is seen that in *L. elpis* nos. 1 and 2 are parallel to each other, arising some distance from the costa and passing in a slight curve across the disc terminating on, or close to, the inner margin; while nos. 3 and 4, also parallel to one another, arise from the costa, but reach only half way across the wing; these last consist of short linear fragments, the last fragment of no. 4 ends on the third median nervule, while no. 3 has an additional fragment extending from the third to the second median nervule; this appears sometimes as a continuation of no. 3 stria, or being much broken from that stria and placed nearer the exterior margin, it appears as common to both nos. 3 and 4, and thus looks like the lower stroke of a Y, of which those two striæ are the upper arms.

The arrangement in *L. elpis* is very different from that in *L. ælianus*; and in the form now under consideration, *L. pseudelpis*, the arrangement is somewhat intermediate between these two older species. In *L. pseudelpis* striæ nos. 1 and 2 are arranged as in *L. elpis*, arising some distance from the costa and gently curving transversely to the inner margin; and nos. 3 and 4 arise as in *L. elpis* from the costa and are at first parallel one to the other. But

no. 4 instead of ending on the third, reaches the second median nervule, and no. 3 on reaching the third median nervule, is suddenly deflected towards no. 2, into which it runs: so that the lower part of no. 2 looks like the lower stroke of a Y, of which its own upper part and No. 3 are the upper arms. This arrangement of nos. 2 and 3 somewhat resembles that in many specimens of *L. ælianus*; so that *L. pseudelpis* seems intermediate between *L. elpis* and *L. ælianus*, although on the upperside it cannot be distinguished from some forms of the former.

737. **Lampides subdita**, Moore.

L. subdita, Moore, Journ. Linn. Soc. Lond., Zoology, vol. xxi, p. 41 (1886).

HABITAT: Mergui, December and March.

EXPANSE: ♂, ♀, 1·0 to 1·4 inches.

DESCRIPTION: "MALE. UPPERSIDE, *both wings* entirely pale glossy purpurascent lavender-blue as in *L. pseudelpis*, Butler, and without any marginal border.* UNDERSIDE, *both wings* darker brown, the white lines all conspicuously narrower. *Forewing* with the discal lines almost straight, continuous, the middle line entire from end to end, whereas in *L. pseudelpis* they are disposed irregularly, and the upper portions are in a curved series; the area between the two marginal lunular lines is also blacker. *Hindwing* with the basal and discal lines also more linearly disposed, beyond which are five very prominent black dentate submarginal spots bordered by the white lunules, the marginal spots also are black, the subanal black spot is only half the size, and its red bordering area much larger and of an oval shape. FEMALE. UPPERSIDE, *both wings* paler greyish-blue. *Forewing* with a broad brown exterior band. *Hindwing* with brown anterior border, and a prominent row of black-centred white spots bordered with brown. UNDERSIDE, *both wings* as in the male."

"Numerous specimens, all alike both on the upper and underside." (*Moore*, l. c.)

A very good and distinct species, which may at once be known on the underside of both wings by the two inner submarginal lines enclosing a series of fuscous spots, the innermost line highly lunular on the hindwing; and the subanal orange patch relatively to the other species of the genus of immense size. These distinctive characters are correlated with a very unusual arrangement of the four transverse discal striæ on the underside of the forewing which is quite unlike that of any other species of the group. Nos. 1 and 2 are short parallel lines arising at some distance from the costa and lying one on each side of the disco-cellular nervules, and having a common posterior segment from the second median nervule to the inner margin; this appears as the lower stroke of a Y, of which striæ nos. 1 and 2 are the upper arms: sometimes no. 1 is continued uninterruptedly to the inner margin, and no. 2 is then short: no. 3 arising, not on, but near the costa, traverses the wing to the inner margin, being however dislocated sometimes more or less at the second median nervule: no. 4 is parallel to the upper part of no. 3, ending at the second median nervule. Altogether this is one of the most distinct species of the group.

Another species of the *L. elpis* group has been described as below† from Malacca. It is based on a single female in the collection of Dr. O. Staudinger. The markings of the underside are precisely similar to those of *L. elpis*, Godart; but the upperside differs from all the specimens of that species I have seen in having the blue coloration very much restricted, confined to the basal half of the forewing, and to an even smaller area in the hindwing.

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* This is incorrect, it has quite as distinct an outer black border as has *L pseudelpis*.

† *Lampides abdul*, Distant, Rhop. Malay., p. 456, n. 6, pl. xliv, fig. 22, *female* (1886). HABITAT: Malacca. EXPANSE: *Female*, 1·2 inches. DESCRIPTION: "FEMALE. UPPERSIDE, *both wings* pale cerulean-blue. *Forewing* with the costal and outer margins—the last very broadly—pale brownish, the outer margin with some indistinct greyish fasciæ. *Hindwing* shaded with pale brownish as on the forewing, but the outer margin broader, with some black spots with bluish margins at the anal angle. UNDERSIDE, *both wings* pale greyish-brown. *Forewing* with two greyish-white fasciæ crossing the wing at the end of the cell commencing at the subcostal nervure, followed by two shorter fasciæ commencing near the lower subcostal nervule and terminating on the third and second median nervules respectively, and two submarginal and a marginal fascia of the same colour. *Hindwing* crossed by greyish fasciæ, a black marginal spot inwardly margined with ochraceous between the second and first median nervules, and a small patch of greenish scales preceded by ochraceous at the anal angle. *Body* and *legs* more or less concolorous with the wings." (*Distant*, l. c.)

738. **Lampides ælianus,** Fabricius.

Hesperia ælianus, Fabricius, Ent. Syst., vol. iii, pt. 1, p. 280, n. 79 (1793) ; *Polyommatus ælianus*, Godart, Enc. Méth., vol. ix, p. 654, n. 123 (1823) ; *Lycæna ælianus*, Horsfield, Cat. Lep. E. I. C., p. 73, n. 9, pl. iv, figs. 1, *larva* ; 1*a*, *pupa* (1828) ; *Lampides ælianus*, Butler, Cat. Fab. Lep. B. M., p. 166, n. 16 (1869) ; id., Moore, Lep. Cey., vol. 1, p. 94, pl. xxxviii, figs. 3, *male* ; 3*a*, *female* ; 3*b*, *larvæ* and *pupæ* (1881) ; id., Distant, Rhop. Malay., p. 228, n. 2, pl. xxi, fig. 18, *male* ; pl. xxii, fig. 19, *male variety* (1884) ; *Papilio alexis*,* Stoll (*nec* Scopoli), Supplement Cramer's Pap. Ex., vol. v, pl. xxxviii, figs. 3, 3C, *male* (1790) ; *Lycæna alexis*, Horsfield and Moore, Cat. Lep. Mus. E. I. C., vol. i, p. 25, n. 20, pl. i, figs. 1, *larva* ; 1*a*, *pupa* (1857) ; idem, id., Proc. Zool. Soc. Lond., 1865, p. 773 ; *Lampides alexis*, id., l. c., 1878, p. 833 ; id., Swinhoe, l. c., 1885, p. 131, n. 49 ; *Lampides zethus*, Hübner, Verz. bek. Schmett., p. 70, n. 684 (1816) ; *Cupido agnata*, Druce, Proc. Zool. Soc. Lond., 1874, p. 106, n. 4, pl. xvi, figs. 2, 4, *male* ; 3, *female* ; *Lampides agnata*, Butler, Trans. Linn. Soc. Lond., Zoology, second series, vol. i, p. 547, n. 8 (1877) ; *Lampides ælianus*, var. *a*, *agnata*, Distant, Rhop. Malay., p. 228 (1884) ; *Lampides conferenda*, Butler, Ann. and Mag. of Nat. Hist., fifth series, vol. xviii, p. 185, n. 25 (1886) ; *Plebeius malaccanus*, Röber, Iris, vol. i, p. 57, pl. iv, fig. 3, *male* (1886).

HABITAT : Throughout India at all elevations not exceeding about 5,000 feet except in the desert regions of Sind, and also throughout Ceylon, in the Andaman Isles, Assam, Burma, Siam, Malay Peninsula, Java, Bantam, Borneo, Timor Laut, Philippines.

EXPANSE : ♂, ♀, 1·3 to 1·6 inches.

Dry-season form.

DESCRIPTION : " MALE. UPPERSIDE, *both wings* milk-white. *Forewing* with a narrow brown posterior border. *Hindwing* surrounded by a delicate black striga, interior to which is an obscure interrupted brown band, in which the large ocellate spot at the anal angle distinctly shows itself. UNDERSIDE, *both wings* grayish-brown, varying in intensity of tint [often of a ferruginous or chestnut-brown tint]. In both wings the ground-colour assumes, in some individuals, between the transverse strigæ a deeper tint, so that these appear to be marked with broad, transverse, brown bands : but this is by no means uniform : some of our specimens have these brown bands very distinct, in others [probably specimens of the wet-season broods] equally well-preserved, the ground-colour is uniform, and the white transverse strigæ preserve the character above described. Forewing with seven, hindwing with nine, transverse white strigæ, of which three are marginal, extending uniformly through both wings. *Forewing*, the remaining strigæ are discoidal [discal], regularly parallel, with a slight inclination to the posterior apical [anal] angle, arranged in two pairs, the first, on the disc, short and separated from the costa by three dots, disposed as the points of a triangle ; the second extending nearly half across the wing, each with a dot at its contact with the costa slightly deviating from the regular course. On reaching the middle of the wing these strigæ are all abruptly terminated at one of the longitudinal nerves, and each pair is continued by a single streak to the posterior margin ; in consequence the strigæ appear divided, resembling in some cases two successive figures of the form of the letter Y. The posterior portions of the strigæ have undefined, spreading edges, and in many individuals the whole of the posterior portion of the wing is milky and discoloured. Of the three marginal strigæ, the interior is broadest and most prominent ; reaching the posterior part of the wing, its inner edge expands in a diffuse radiant border, gradually mingling itself with the cloudy milky surface ; the intermediate one is undulating, and composed of a connected series of lunules directed outwards ; the exterior striga is continued, regular, parallel with the margin, and exteriorly defined by a narrow black line, beyond which is a grayish *cilia*. *Hindwing*, these marginal strigæ preserve the same character, until they are partially interrupted in the anal region ; the surface of the wing is further marked with six transverse strigæ, disposed in three pairs, one near the base, a second across the disc, a third intermediate between this and the marginal ones ; the basal strigæ are delicate and regularly transverse, with a slight curve at the interior margin ; the discoidal pair is not continued quite to the exterior margin, but has, at its commencement, a short intermediate lineola ; at the interior margin it is inflected inwards, so as to form, abruptly, an acute angle ; the third pair extends only half across the wing, having a short intermediate lineola at its posterior termination. In the anal region there are three ocellated spots ; the largest, situated on the posterior margin just without the caudal

* I retain the better-known name *ælianus* for this species, though *alexis* is prior in date.

appendage, is ovate, bounded internally by a narrow orange crescent, and externally by a streak covered with greenish-silvery irrorations ; at its internal edge is a reniform spot, intensely black towards the anal angle, surmounted by a silvery lunule and a small orange crescent, and touching at the extreme anal angle a minute, dark-coloured, blind ocellus. *Tail* lengthened, slender, brown above, and white underneath and at the extremity. *Antennæ* black and regularly fasciated with white externally. *Body* pale blue above, white underneath. FEMALE. UPPERSIDE, *both wings* milk-white, with a broad brown border, which in the *forewing* is simple and more extended near the tip, in the *hindwing* waving internally and bearing a series of brown spots of a deeper tint towards the anal extremity ; these spots are enclosed individually by two white crescents applied to each other from the opposite sides and forming a white ring, exterior to which is a deep brown marginal streak, terminated by a grayish-brown *cilia*." UNDERSIDE, *both wings* as in the male. (*Horsfield*, l. c.)

Wet-season form.

DESCRIPTION : MALE and FEMALE. UNDERSIDE, *both wings* differ in the ground-colour being darker, more inclined to plumbeous, instead of being "grayish-brown" as in the dry-season form ; all the white strigæ prominent and well-defined, their edges never blurred ; the space between the strigæ on the disc always concolorous with the rest of the wing, never forming distinct darker bands. *Forewing* with the ground-colour always uniform, never becoming white on the disc towards the anal angle. *Hindwing* with the anal ocelli large, well-formed, and prominently inwardly crowned with orange.

The arrangement of the four "characteristic" striæ is clearly and minutely given by Horsfield, and it would appear that in all his Javan specimens striæ nos. 1 and 3 (which alone completely traverse the disc) were distinct ; and that "in some cases" their inferior portions appeared as the straight strokes of Ys, of which their upper portions formed the left arms. This arrangement of Ys is common also in Indian specimens ; but, as it is not universal, it may be well to state the arrangement of these striæ in a form which will embrace all individuals that have come under my notice.

All four striæ start from the costa, or, more exactly, are only separated from the costa by small dots. Nos. 1 and 3 extend across the wing to the inner margin ; but nos. 2 and 4 are short and reach only the third and second median nervules respectively. Sometimes each of the striæ nos. 1 and 3 is continued uninterruptedly across the disc, in which case the four striæ are parallel and nowhere in contact. But often they are dislocated, no. 1 on the median nervure, no. 3 on its first branch : sometimes one only is dislocated, sometimes both ; in the latter case the result is that two Ys are formed, as noted by Horsfield ; in the former case, while nos. 1 and 4 remain as two independent more or less uniform and continuous striæ, nos. 2 and 3 form a Y intermediate between them. This last is the usual arrangement in the dry-season forms, which present the dark bands between nos. 1 and 2 and nos. 3 and 4 as one very distinct and broad-stroked Y occupying the whole disc of the wing. All these modifications of the striæ occur in the same broods, and in series of insects caught at the same place and at the same time. But whatever be the dislocations, all four striæ arise on the costa, nos. 1 and 3 are continued almost to the inner margin, no. 2 extends only to the third, and no. 4 to the second median nervule.

It will be observed that Horsfield in his ample and minute description includes in the one species *ælianus*, insects with uniform tint of under surface crossed by distinct white striæ, and also those with ground tint below variegated and clouded with white and traversed by broad dark bands (*alexis*) : but Messrs. Butler and Swinhoe consider the latter form of *L. ælianus* to represent a distinct species, and apply Stoll's name *alexis* to it. Messrs. Godart, Felder, Horsfield, Moore, and Distant agree with me in considering these two species synonymous, and I have cleared up the matter a little by indicating that typical *alexis* represents the dry-season and typical *ælianus* the wet-season form of one species. The dry-season form of *L. ælianus* is immensely variable ; in the description of it given above I have indicated its main characteristics only. Mr. Butler has quite recently described one of the varieties of the

dry-season form of *L. ælianus* as a distinct species as below, calling it *L. conferenda*.* I also give descriptions of *L. agnata*, Druce, and *L. malaccanus*, Röber, which appear to represent other varietal forms, and are treated as such by Mr. Distant.

LARVA when full-fed just half an inch in length, of a dull reddish-green colour, thickly shagreened with minute white tubercles, scarcely if at all hairy; the head pale ochreous, entirely hidden beneath the second segment, the segments increasing in width to about the fifth, the two anal segments slightly decreasing and above flattened, especially the thirteenth; the erectile organs very small; a dorsal pulsating line somewhat darker than the rest of the body, a subdorsal series of pale green oblique streaks, one on each segment on each side from the third to the eleventh segment inclusive; no other conspicuous markings. Dr. Forel has identified the ant that attends the larva in Calcutta as *Camponotus mitis*, Smith (=*bacchus*, Smith, =*ventralis*, Smith). Dr. G. King identifies the plant on which the larva feeds in Calcutta as *Heynea trijuga*, Roxburgh. PUPA of the usual lycænid shape, quite smooth, neither hairy nor pitted, pale ochreous-greenish, the upper portions of the abdominal segments darker, covered throughout with coarse rounded blackish spots placed irregularly; a dorsal and subdorsal series of similar but larger spots or blotches placed regularly. Head bluntly rounded, thorax slightly humped and constricted posteriorly, end of the abdomen rounded.

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* *Lampides conferenda*, Butler, Ann. and Mag. of Nat. Hist., fifth series, vol. xviii, p. 185, n. 25 (1886). HABITAT: Deyra Doon, Poona, Calcutta, Sylhet, Assam, Sheemagar, and thirty miles above Mandalay, Upper Burma, December. EXPANSE: 1·25 inches. DESCRIPTION: "Hitherto confounded with *L. alexis*, Stoll, but readily to be distinguished from the fact that it is of a sandy instead of greyish-brown colour on the UNDERSIDE, and that the whole of the bands are shifted backwards towards the base, leaving a wide pale band between the discal bands and the external border; the submarginal series of spots ill-defined; none of the markings distinctly white-edged, and the subanal ocellus of the *hindwing* very small."

"This is the commonest form of the *L. alexis* group. Though hitherto regarded as a variety of *L. alexis*, it has as much claim to specific rank as any of the species of the *L. elpis* group,* the differences being precisely of the same character as in the variously named forms of that group." (*Butler*, l. c.)

This is a very common dry-season form of *L. ælianus*, which, according to Colonel Lang, "occurs plentifully in September and October on the lower slopes and in the valleys below Naini Tal, from 4,000 feet elevation downwards to 1,000 feet, but it is mixed with others having different tints (brown, ferruginous or castaneous) of the underside, and it occurs on exactly the same ground as the previous wet-season broods of typical *L. ælianus*. *L. alexis* (with *L. conferenda*, which is only one of the many forms which cannot be separated off into definite or distinct varieties even) is only the (dry) seasonal form of typical *L. ælianus*."

* This is probably a slip for "*L. ælianus* group," as *L. alexis* has nothing to do with *L. elpis*, and is, in fact, placed by Mr. Moore in his Lep. Cey. as a synonym of *L. ælianus*.

Lampides (*Cupido*) *agnata*, Druce, Proc. Zool. Soc. Lond., 1874, p. 106, n. 4, pl. xvi, figs. 2, 4, *male*; 3, *female*; *Lampides agnata*, Butler, Trans. Linn. Soc. Lond., Zoology, second series, vol. i, p. 547, n 8 (1877); *L. ælianus*, var. *a*, *agnata*, Distant, Rhop. Malay., p. 228 (1884). HABITAT: Malacca; Singapore; Nahconchaisee, Siam. EXPANSE: *Male* and *female*, 1·5 inches. DESCRIPTION: "MALE. UPPERSIDE, *both wings* bluish-white. *Forewing* with the outer margin slightly dusky. UNDERSIDE, *both wings* pale greyish-brown. *Forewing* crossed beyond the cell with six irregular white bands. *Hindwing* with eight, the first two close to the base; two black spots near the anal angle surrounded with orange. FEMALE. UPPERSIDE, *both wings* bluish-white. *Forewing* with the apical half pale brown, broadest at the costal margin. *Hindwing* from the base to the apex brown, extending to the middle of the cell, outer margin brown, crossed by a band of white lunular markings. UNDERSIDE, *both wings* as in the male." (*Druce*, l. c.)

"This proposed species, judging from Mr. Druce's figures, appears to be a variety of *L. ælianus*, differing from the typical form on the underside of the forewing, by the arrangement of the greyish linear fasciæ, of which the innermost of the first and second pairs appear to be—beneath the cellular area—more irregularly deflected and waved." (*Distant*, l. c.)

Lampides malaccanus, Röber. *Plebeius malaccanus*, Röber, Isis, vol. i, p. 57, pl. iv, fig. 3, *male* (1886). HABITAT: Perak, Philippines. EXPANSE: *Male*, 1·3 inches. DESCRIPTION: "MALE. UPPERSIDE, *both wings* light blue with a more saturated exterior margin (Malacca), whitish-blue (Philippines); the white markings of the underside showing through, slightly on the forewing, more so on the hindwing; the exterior margin in the blue specimens dark brown, on the hindwing with an interrupted white marginal line, and a few dark spots on the exterior margin; in the light specimens the markings of the underside shew through more, and on this account on the exterior margin of the forewing there are some dark spots and a dark band, as also on the exterior margin of the hindwing is a row of dark light-encircled spots, and a dark undulating band; the costal and inner margins of the hindwing whitish; the *tail* with a white tip. UNDERSIDE, *both wings* grey-brown with white markings, on the exterior margin somewhat darker; the large black spot between the first and second median nervules of the hindwing very broadly encircled with orange and dusted with metallic green; the small black spot at the anal angle dusted with metallic green and encircled with yellow. *Thorax* clothed with blue hairs; *abdomen* above grey-brown, below and *pectus* whitish; *antennæ* black, ringed with white below; *palpi* black above, white below; *legs* white; *tarsi* ringed with black." (*Röber*, l. c.)

Judging from the figure, this species has the outer black margin to the forewing on the upperside a little less wide than in typical *L. ælianus*, Fabricius, rather broader than in *L. pura*, Moore. On the underside of the forewing the characteristic striæ are arranged as follows:—No. 1 is continuous from the costa to the inner margin; no. 2 is short, extending from the costa to the median nervure; no. 3 is long, reaches from the costa to the inner margin, and is deflected inwardly somewhat (though not broken) below the median nervure, forming a Y with no. 2 stria, this stria forming the left upper arm of the Y; no. 4 stria is short, extends from the costa to the second median nervule. This species may, perhaps, be known by the large size of the black spot broadly encircled with orange in the first median interspace of the hindwing on the underside, which, as figured, appears to be nearly as large as the ocellus in *L. subdita*, Moore.

In Java Dr. Horsfield records the larva as feeding on *Butea frondosa*. From Ceylon Mr. Moore describes the larva as "onisciform; green or violet-brown, with a dark dorsal and lateral black lines. Pupa pale violet-brown."

Little need be said about the occurrence of this common butterfly in India. Colonel Lang records it from Almora, 5,500 feet, which is probably the highest altitude it reaches in the Himalayas. It is found almost everywhere except in the desert regions of Sind, and is probably common everywhere where it occurs. Mr. G. F. Hampson notes that in the Nilgiri Hills "the dry-season brood of *L. ælianus*, Fabricius, is much paler than the wet-season brood." Colonel Lang writes on the same subject "How very different are the two broods, the summer and autumn, wet and dry season! They look marvellously distinct both on the wing and in the cabinet."

739. **Lampides pura**, Moore. (FRONTISPIECE, FIG. 132 ♀, DRY-SEASON FORM).

L. pura, Moore, Journ. Linn. Soc. Lond., Zoology, vol. xxi, p. 41 (1886).

HABITAT: Assam; Chittagong Hill Tracts; Mergui, December to March.

EXPANSE: ♂, ♀, 1·12 to 1·50 inches.

Wet-season form.

DESCRIPTION: "Allied to *L. ælianus*, Fabricius, *L. celerio*, Fabricius, and *L. agnata*, Druce. MALE. UPPERSIDE, *both wings* of the same pale-bluish tint as in the above-named species. *Forewing* entirely without any trace of a black border to the exterior margin, whereas in each of the above species there is a decided black marginal band decreasing in width from the apex. UNDERSIDE, *both wings* of a similar colour as in the above species, but of a darker tint than in *L. ælianus*; markings also similar, but more strongly defined. *Forewing* in several specimens without a marginal border. *Hindwing*, subanal spot with a much broader red inner border. FEMALE. UPPERSIDE, *forewing* with the marginal black band narrower than in *L. ælianus*, the inner edge of the band curved like that in *L. alexis*, Stoll. *Hindwing* with a narrower series of marginal lunular spots." (*Moore*, l. c.)

In the Indian Museum, Calcutta, are three males and one female of this species, which include the type specimens, from Mergui. I also possess a single male, taken at Terria Ghât in Assam in the autumn, which agrees with the Mergui specimens. Mr. Moore says that this species has no trace of a black border to the outer margin of the forewing on the upperside of the male. There is, however, a very distinct anteciliary black thread, and this thread, being of equal width throughout both wings, not expanded into a more or less broad black border in the forewing, constitutes the best character, as far as I can see, for distinguishing *L. pura*. I do not understand Mr. Moore's remark that the underside of the forewing in several specimens has no marginal border. The five Mergui specimens I have before me agree precisely in markings on the underside, one with another, and also with many specimens of *L. ælianus*. The arrangement of the four characteristic striæ is similar to that of many *L. ælianus*. In all the five specimens above mentioned the arrangement is identical. Nos. 1 and 3 cross the wing uninterruptedly from the costa to the inner margin, no. 3 is very slightly dislocated on the second median nervule, the lower portion more or less slightly shifted towards the base: nos. 2 and 4 end on the third and second median nervules respectively; and, as no. 2 is inclined slightly outwards towards no. 3, it meets or nearly meets this stria at the point of dislocation, thus forming with it a distinct Y, intermediate between nos. 1 and 4. It remains to be seen, from larger series collected in and near Mergui, if the Tenasserim form is perfectly constant in this arrangement of the four striæ, nos. 2 and 3 forming a distinct Y between the straight nos. 1 and 4 striæ, and also in the extreme fineness and uniformity of width of the marginal border of the forewing on the upperside in the male. These at the best are but very slight characters by which to separate this as a distinct form from the variable *L. ælianus*.

Dry-season form.

In the Indian Museum, Calcutta, are six males and two females of a *Lampides* taken in November and January in the Chittagong Hill Tracts by the late Mr. H. M. Parish, which I

believe to be the dry-season form of *L. pura.* It should be noted, however, that the Mergui specimens were all taken during the cold-season, when the weather is usually quite dry over the greater portion of Northern India. There may, however, have been a spell of wet weather at some period during the earlier life of these specimens which caused the imagines to assume the garb of the wet-season form, or, still more probably, Burma often being very wet during the winter, there may in Mergui be no dry-season form at all of *L. pura.* These Chittagong specimens differ in the usual way from the wet-season form ; the ground-colour of the underside of both wings is cinnamon-brown, except a discal suffused white patch on the forewing, striæ nos. 1 and 2, also nos. 3 and 4, of the forewing are entirely filled in with deeper brown, and all four striæ together forming a single large Y across the disc of the wing. In the hindwing the basal and discal striæ are all filled in with dark brown in the same way, three broad dark brown bands across the wing therefore resulting. The orange spot at the anal angle of the hindwing also is very small, in some specimens quite obsolete. The upperside of the males of these six Chittagong specimens has the fine black marginal thread characteristic of *L. pura*, and by which alone I can recognise them as appertaining to that species, but in all other respects they are the ordinary dry-season form of *L. ælianus.*

The figure shews both sides of a female specimen of the dry-season form of this species taken in the Chittagong Hill Tracts, and now in the collection of the Indian Museum, Calcutta.

740. **Lampides kinkurka**, Felder.

Lycæna kinkurka, Felder, Verh. zool.-bot. Gesellsch. Wien, vol. xii, p. 481, n. 107 (1862) ; idem. id., Reise Novara, Lep., vol. ii, p. 273, n. 336, pl. xxxiv, figs. 24, 25, *female* (1865) ; *Lampides kinkurka*, Moore, Proc. Zool. Soc. Lond., 1877, p. 588 ; *L. ælianus*, Wood-Mason and de Nicéville (*nec* Fabricius), Journ. A. S. B., vol. l, pt. 2, p. 234, n. 30 (1881) ; idem, id., l. c., vol. li, pt. 2, p. 17, n. 32 (1882).

HABITAT : Kar Nicobar (*Felder*), Nankowri (*Moore*), Kamorta, Teressa, Trinkut, Nankowri, Katschall, and Great Nicobar (*de Roepstorff* and *Man*)—all in the Nicobar Isles.

EXPANSE : ♂, ♀, 1·1 to 1·5 inches.

DESCRIPTION : "FEMALE. UPPERSIDE, *both wings* opalescent whitish, powdered with brownish towards the base, a blackish streak before the cilia. *Forewing* with the outer border somewhat fuscous, broader at the apex, divided by whitish diffused increasing spots and a submarginal line. *Hindwing* with external lunules somewhat fuscous in a bent series, and others submarginal smoky blackish-fuscous (the last but two of these larger, the last but one bent, transversely protracted). UNDERSIDE, *both wings* whitish, tinted brownish beyond the middle, a streak before the cilia and a series of small submarginal spots fuscous. *Forewing* with two subcostal spots, a broken discal fasciole, and another beyond it chain-shaped and an exterior fascia confluent formed of lunules. *Hindwing* with a basal fasciole, a discal fascia, strongly broken at the trunks of the nervules hindwardly inflected and with a fasciole adherent beyond it of the ground-colour, partly circled with fuscous and bordered with whitish, inconspicuous, an external bent fascia of fuscous lunules covered over by a largish posterior spot, with a yellowish encircling lunule, and another minute subanal inwardly circled with luteous black, slightly sprinkled with metallic."

"This splendid species is allied to *L. alexis*, Stoll (=*ælianus*, Fabricius)." (*Felder*, l. c. in Reise Novara.)

L. kinkurka is by far the commonest species of the genus occurring in the Nicobars. The male on the upperside of the forewing has a somewhat indistinct and inwardly diffused submarginal very pale dusky band, then a band of lunules of the ground-colour, or of a rather lighter tint, then a series of blackish oval spots between the veins, outwardly defined by a white, and then a black marginal thread. The hindwing is similarly marked, but the oval blackish spots are larger and darker. The disposition of the white lines on the underside of the forewing is most irregular, but they are never arranged as in *L. kankena*, Felder, or *L. kondulana*, Felder. The four characteristic striæ may be described thus :—nos. 1 and 2 (as in the *elpis* group) arise far from the costa on the subcostal nervure ; while nos. 3 and 4 arise almost on the costa itself. Nos. 1 and 4 are short, no. 1 ending on the median nervure,

and no. 4 on the second median nervule. Sometimes no. 2 is short instead of no. 1, and ends on the median nervure, in which case no. 1 is long and is continued almost to the inner margin, and all four striæ are parallel. No. 3 extends continuously nearly to the inner margin, though it is slightly dislocated where it crosses the second median nervule, the dislocation tending to shift the lower portion inwardly towards the base, and this inward shifting is sometimes carried to quite a considerable extent. No. 2 is carried continuously almost to the inner margin; but it also is liable to considerable dislocation, the lower portion being shifted towards the base, so that sometimes it almost reaches no. 1 stria. This arrangement presents the appearance of a Y, more or less perfect or distorted, formed by nos. 1 and 2 striæ; which is followed by a long continuous stria across the wing (no. 3), and a short one beyond (no. 4). When the location of the Y is perfect it is as in *L. subdita*, Moore; while *L. ælianus*, Fabricius (usually), *L. pseudelpis*, Butler, and *L. pura*, Moore, have the Y intermediate between striæ nos. 1 and 4; and *L. elpis*, Godart, *L. kondulana*, Felder, and *L. kankena*, Felder, have no appearance of a Y at all.

Mr. Wood-Mason and I have twice recorded *L. ælianus* from the Nicobars; this is incorrect, however, the specimens belonged to the present species. Mr. Moore has had equal difficulty in recognising the species, as he has identified several specimens of it for the Indian Museum, Calcutta, as *L. kankena*, an apparently distinct species or geographical race occurring in Kar Nicobar only, and having a distinct striation on the underside.

Mr. E. H. Man and the late Mr. A. R. de Roepstorff have both sent numerous specimens of a *Lampides* from the island of Great Nicobar, which differ from specimens of *L. kinkurka* from the other islands of the Nicobars enumerated above in being larger, and in having the upperside of both sexes leaden (sooty) instead of opalescent whitish. The striation of the underside agrees with that of typical *L. kinkurka*, and I do not consider this local race as of sufficient distinctness to deserve a specific name to be applied to it.

Another species of this group which has been described as below* from the Malay Peninsula, is probably only a variety of *L. ælianus*, though it is kept distinct by Mr. Distant. The characteristic striæ are arranged as follows:—Nos. 1 and 2 striæ form a Y, of which the two arms are, of course, the short upper portions of the striæ; no. 3 stria is continuous from the costa to the inner margin; no. 4 stria is short, and runs from the costa to the second median nervule. The subanal spot to the hindwing is as in typical *L. ælianus*.

741. **Lampides kondulana**, Felder.

Lycæna kondulana, Felder, Verh. zool.-bot. Gesellsch. Wien, vol. xii, p. 484, n. 118 (1862); idem, id., Reise Novara, Lep., vol. ii, p. 271, n. 332, pl. xxxiv, fig. 6, *male* (1865); *Lampides kondulana*, Moore, Proc. Zool. Soc. Lond., 1877, p. 588.

HABITAT: Kondul Island (*Felder*), Nankowri (*de Roepstorff*), both of the Nicobars; ? Andamans (*Moore*).

EXPANSE: ♂, ♀, 1·4 to 1·5 inches.

DESCRIPTION: "MALE. UPPERSIDE, *both wings* bluish-whitish, slightly shining, a fuscous striga before the cilia. *Forewing* with diffused fuscous striolæ before the margin, outwardly resting on an obsolete white line. *Hindwing* with rather larger fuscous spots before the margin, outwardly margined with whitish, the last but one the largest of all, and darker; the anal one transversely lengthened, inwardly also margined with whitish and with

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* *Lampides optimus*, Röber. *Plebeius optimus*, Röber, Iris, vol. i, p. 56, pl. iv, fig. 16, *female* (1886); id., Distant, Rhop. Malay., p. 456, n. 5, woodcut n. 127, *female* (1886). HABITAT: Perak, East Celebes (*Röber*), Borneo (*Distant*). EXPANSE: *Male* and *female*, 1·1 to 1·25 inches. DESCRIPTION: "MALE. UPPERSIDE, *both wings* whitish-blue, the wbite markings of the underside showing through. *Forewing* with the exterior margin greyish-brown. *Hindwing* with a darker marginal line, inner margin whitish, and with white *cilia*, darker at the nervules; *tail* with a white tip. UNDERSIDE, *both wings* light fawn-gray with white markings. *Forewing* with the inner margin whitisb. *Hindwing* with the black spot between the first and second median nervules enclosed in broad orange, at the sides dusted with metallic green; at the anal angle a smaller blacker spot enclosed in orange. FEMALE. UPPERSIDE, *forewing* with a broad dark grey exterior margin. *Hindwing* with a series of darker white-encircled spots on the exterior margin. UNDERSIDE, *both wings* as in the male. *Thorax* bluish; *abdomen* dark above, whitish below; *pectus* the same; *antennæ* black, ringed with white; *palpi* black above, white below; *legs* black outside, white within; *tarsi* ringed with black." (*Röber*, l. c.)

another of the same colour of the same form joined to it. UNDERSIDE, *both wings* pale hoary-brownish, with a fuscous marginal streak and a silvery line before the cilia, two fasciæ before the margin which are both fuscous bordered with whitish, and macular (getting wider on the hindwing). *Forewing* with a discal fascia between the internal nervure and the upper discoidal nervule, and beyond it a fasciole which is unequal-sided and chain-like of the ground-colour, laterally bordered with fuscous and margined with whitish. *Hindwing* with a basal abbreviated fascia slightly broken at the subcostal nervure, an internal spot, a discal fascia, terminated at the subcostal nervure hindwardly bent, and another exterior abbreviated very strongly broken at the first subcostal nervule, hindwardly emitting a minute whitish spot of the same colour, an awl-shaped spot at the third median nervule, a larger hinder lunule encircling a large black cuneate-oval spot, most sparingly sprinkled outwardly with metallic, and a small subanal spot, placed outwardly on a rounded black spot, inwardly sprinkled with metallic-greenish, pale yellowish."

"This splendid species is most nearly allied to the preceding [*L. kankena*, Felder], but is distinguished from it by the production of the apex of the forewing, by the slightness of the curvature of the outer border of the hindwing, and the straightness of the margin between the first subcostal and the second median nervules of the hindwing." (*Felder*, l. c., in Reise Novara.)

In the Indian Museum, Calcutta, are a pair only of this species taken by the late Mr. F. A. de Roepstorff, on the island of Nankowri in the Nicobars. The male is easily distinguished from all other species known to me by having short black streaks (striolæ) between the veins just within the anteciliary fine black thread on the upperside of the forewing, from which black thread they are separated by an obsolete white line, on which (as Felder states) they are seated; on the hindwing these striolæ are produced in an increasing series of spots, the largest of which is round and in the first median interspace, and beyond which are two black transverse lines, one above the other, from the first median nervule to the abdominal margin. On the underside also the markings are very distinctive, there being a pair of strictly continuous white lines (characteristic striæ nos. 1 and 2) on the forewing from the subcostal to the submedian nervure enclosing the disco-cellular nervules, with a shorter pair of lines beyond (nos. 3 and 4), the inner line from the subcostal nervure to the second median nervule, the outer line also from the subcostal nervure, but terminating on the third median nervule. These are the four 'characteristic' striæ, and it will be seen that they agree almost exactly with those of *L. elpis*, and are quite distinct from those of *L. ælianus*. These insects, in fact, have the general aspect of *L. ælianus* above and of *L. elpis* below. They are of the 'wet-season' coloration. The female differs from the male on the upperside of the forewing in having a broad outer dusky margin, which widens out very much at the apex. The hindwing has the marginal series of black spots rather larger than in the male, with an inner submarginal lunular blackish band, which also is faintly present in the male. Underside marked like the male. I may add that the female has been identified by Mr. Moore, and also by Herr A. F. Rogenhofer, of the Vienna Natural History Museum, who has compared the specimen with Felder's type. Mr. Moore also identifies the male as *L. kondulana*, and both sexes agree with Felder's figure in the arrangement of the four white discal lines on the underside of the forewing, which is a very notable distinctive character of the species, and serves to distinguish it from the other Nicobar form *L. kinkurka*, which has an entirely different arrangement of the characteristic striæ: while *L. kankena* appears to have the same arrangement as *L. kondulana*, from which it differs only in the absence on the upperside of the above-noted dark striolæ on the outer margin of the forewing of the male. *L. kondulana* and *L. kankena* may be geographical varieties, the former perhaps is restricted to the islands of Nankowri and Kondul, while the latter occurs only on Kar Nicobar. Mr. Moore records this species from the Andamans (Port Blair), but this is probably a mistake, as he does not give *L. ælianus*, Fabricius, from thence, though undoubtedly it occurs very commonly.

742. **Lampides kankena**, Felder.

Lycæna kankena, Felder, Verh. zool.-bot. Gesellsch. Wien, vol. xii, p. 481, n. 106 (1862); dem, id., Reise Novara, Lep., vol. ii, p. 270, n. 331, pl. xxxiv, fig. 37, *male* (1865).

HABITAT: Kar Nicobar (*Felder*).

EXPANSE: ♂, 1·35 inches.

DESCRIPTION: "MALE. UPPERSIDE, *both wings* pale silvery-blue, with a fuscous striga before the cilia. *Forewing* with the apical border darker. *Hindwing* with an obsolete whitish submarginal streak, an anal spot transversely protracted and two small striæ set on it fuscous circled with whitish. UNDERSIDE, *both wings* pale hoary-fuscous, a silvery line before the cilia, interrupted at the veins in the hindwing, before it a fuscous streak, inwardly defined with a whitish streak (macular on the hindwing). *Forewing* with an abbreviated discal fascia and a fasciole beyond it, emitting a litura of the ground-colour, laterally circled with fuscous and whitish; a pair of submarginal fasciæ with connate spots a little darker than the ground-colour, circled with whitish. *Hindwing* with a basal fascia strongly broken at the subcostal nervure, an internal spot, a discal fascia, ceasing at the second subcostal nervule, hindwardly bent, and another beyond it, abbreviated broader, terminated at the third median nervule and there emitting a whitish litura, strongly broken at the subcostal nervules, all of the ground-colour, circled with fuscous and whitish, two submarginal fasciæ, with spots darker than the ground-colour, and circled with whitish, connate, a large hinder black spot, inwardly encircled with a luteous lunule, outwardly dotted with metallic and a minute subanal black spot, bordered inwardly with luteous, outwardly bordered with metallic."

"Is similar to *L. nemea*, Felder, from Amboina, in the coloration of the upperside, but has more resemblance to *L. amphissa*, Felder, from Batjan, in the shape of the wings. The underside, however, is very different from that of either of these species." (*Felder*, l. c. in Reise Novara.)

Dr. Felder only figures the underside of this species; and in this the white lines of the forewing appear to be arranged much as in *L. kondulana*, Felder, the pair on either side of the disco-cellular nervules (characteristic striæ nos. 1 and 2) being continued in a straight line to the submedian nervure; no. 3 stria reaches the second and no. 4 stria the third median nervule; and these two latter striæ are parallel to one another. The description of the fasciæ of the underside of the forewing is generally as in that of *L. kondulana*, Felder. I have not seen any specimens which exactly fit Felder's description; and although Mr. Moore identified for the Indian Museum, Calcutta, as "probably *L. kankena*," insects taken by the late Mr. F. A. de Roepstorff and Mr. E. H. Man on Great Nicobar, these cannot, however, belong to this species owing to a distinct striation below, and are considered by me to be a local race of *L. kinkunka*, Felder. *L. kankena* may be confined to Kar Nicobar Island, taking there the place of *L. kondulana*, Felder, to which it is very closely allied, and from which it may be difficult to separate it as a distinct species. I should add that *L. nemea* is figured with the coloration of the *elpis* group, and, as *L. kankena* is said to be coloured in the male on the upperside as in *L. nemea*, it may not belong to this group at all, though the words "pale silvery-blue" would seem to show that it belongs to the *ælianus* group.

I append a description of *L. marakata*, Doherty, MS.* from Perak. It is the only species of the genus which is green instead of blue on the upperside.

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* *Lampides marakata*, n. sp., Doherty, MS. HABITAT: Padang Rangas, Perak. EXPANSE: Not given. DESCRIPTION: "MALE. UPPERSIDE, *forewing* with the base and disc from the inner margin to just above the discoidal cell light green of a peculiar shade and a satiny lustre, the margin very widely and evenly and the costa more narrowly black, occupying more than half of the surface, more or less sprinkled with green scales near the green area. *Cilia* obscurely whitish at tip. *Hindwing* with the basal third partially, the cell wholly green; a slender purplish marginal line interrupted at the ends of the veins; a similar submarginal line extending from the second median nervule to the abdominal margin, enclosing with the other a very dark band. UNDERSIDE, *both wings* uniform grey, marked very much as in *L. ælianus*, Fabricius. *Forewing* with the transverse white markings broken, the lower ones placed below the disco-cellular band as if in continuation of them. *Hindwing* with a large orange ocellus with a black and metallic centre; a black marginal and a white submarginal line. *Cilia* white at base, grey at tip."

"This species has, like the others of the genus, its characteristic form of prehensores. Seen from the side the *clasp* is divided into two longitudinal horizontal lobes, the lower thick at base then narrowed, the end

The third subgroup comprises four genera which practically agree in the disposition of the veins of the wings; so that once more general *facies* has to be relied on as a distinguishing character. The first three genera, *Catochrysops*, Boisduval, *Tarucus*, Moore, and *Castalius*, Hübner, have the first subcostal nervule of the forewing impinging on, or touching, the costal nervure; but though the two veins run side by side for some little distance, they are not anastomosed into a single vein as in the first subgroup of the *Polyommatus* group. In these three genera these two veins are sometimes slightly separated from one another; in the fourth genus, *Polyommatus*, Latreille, the veins are well-separated. The first genus, *Catochrysops*, has the males of different shades of blue or purple on the upperside; the underside is brown or drab; the forewing has no basal markings, but bears a disco-cellular spot, a discal catenulated band, and the usual marginal markings. The hindwing has always two prominent black dots just below the costa, sometimes with additional similar basal dots, one or two prominent black orange-crowned, silver-speckled, subanal spots, and whitish catenulated markings as in the forewing. The females are blackish on the upperside, with the usual discal metallic blue areas. The genus has a very wide range in southern Asia, occurring throughout the Malay Archipelago, and extending to Australia, and to the South Sea Islands. It probably also occurs in Africa. The next genus, *Tarucus*, has the markings of the underside quite different from those of *Catochrysops*; the base of the forewing is marked with streaks and spots, there are no catenulated markings, but the entire surface of both wings is covered with black, brown, or rusty-red dashes and spots. It occurs in Southern Europe, Africa, Asia Minor, Persia, almost throughout India, and Ceylon, and one species is found in Java. The next genus, *Castalius*, has the markings on the underside of the typical species (*C. rosimon*, Fabricius) not unlike those of *Tarucus*, but fewer in number and larger in size; the other species of the genus have still fewer markings, which are often concentrated into broad bands and patches. The genus does not occur in Europe, but is found in Africa, throughout India, Ceylon, and the Malay Peninsula and Archipelago. The last genus, *Polyommatus*, is a very small one, and the typical species (*P. bœticus*, Linnæus) has a style of markings on the underside which is quite peculiar to itself, consisting of very numerous closely-placed short pale ochreous bands, with two prominent black silver-spangled subanal spots to the hindwing. It has an immense range in the old world, occurring in Europe, Africa, Asia, Australia, and many oceanic islands. It does not seem to have reached America yet, but sooner or later it is almost sure to do so. The males of all the species of all these genera entirely lack secondary sexual characters. Both sexes have a filamentous tail to the hindwing from the termination of the first median nervule.

Genus 121.—Catochrysops, Boisduval. (PLATE XXVII).

Catochrysops, Boisduval, Voy. Astrolabe, Lep., pt. 1, p. 87 (1832); id., Moore, Lep. Cey., p. 90 (1881); id., Distant, Rhop. Malay., p. 223 (1884).

"FOREWING, triangular; *costal nervure* extending half the wing, bent upwards to the costa near the end; *first subcostal nervule* emitted at nearly one-half before the end of the cell, curved upwards and slightly touching the costal nervure; *second* subcostal emitted at one-third, *third* subcostal at one-eighth before the end of the cell, *fourth* subcostal at two-thirds from the base of the third and terminating at the apex, *fifth* subcostal from the end of the cell; [*middle* and *lower*] *disco-cellular* nervules slightly concave; [*lower*] *discoidal* nervule from their middle; *discoidal cell* narrower than in the genus *Nacaduba*, Moore, extending to half length of the wing; *second median nervule* from immediately before the end of the cell, *first* median at one-half before the end. HINDWING, short, triangularly-oval; *abdominal margin* long; furnished with a single

strongly clavate and truncate, with a sharp projection from the upper side. Upper lobe very slender, somewhat shorter than the other, sinuous, strongly bent inwards at the tip, so as to meet that of the opposite clasp."

"Female unknown. A single male taken in deep forest near Padang Rangas, Perak, at 1,000 feet elevation. The substitution of green for the usual light blue tints of allied species, and the very broad black margin, giving it the air of a female, secure for this butterfly quite a unique position in tbe genus." (*Doherty*, MS.)

slender tail [at the termination of the first median nervule]; *costal nervure* much arched; *first subcostal nervule* slightly curved, emitted at one-fourth before the end of the discoidal cell; *disco-cellular* nervules obliquely recurved; *discoidal* nervule from their middle; *discoidal cell* broad; *third* and *second median nervules* from the end of the cell, *first* median at one-half before the end; *submedian nervure* straight, *internal* nervure recurved. BODY, moderate; *palpi* porrect, second joint laxly squamose, third joint long, slender; *legs* slender; *antennæ* with the club rather short, grooved;" *eyes* hairy in *C. strabo*, Fabricius, naked in *C. cnejus*, Fabricius, and *C. pandava*, Horsfield. "Type, *C. strabo*, Fabricius." (*Moore*, l. c.)

The costal nervure of the forewing terminates just opposite the apex of the discoidal cell; the first subcostal nervule is bent upwards just beyond its base, and runs parallel with and touches the costal nervule for a short distance but does not completely anastomose with it; the origin of the second subcostal is nearer the base of the first subcostal than to the base of the upper discoidal; the third subcostal nervule is emitted from the subcostal nervure just midway between the base of the upper discoidal and the apex of the wing; the upper discoidal originates from the subcostal nervure before the apex of the cell, consequently there is no upper disco-cellular nervule; the middle and lower disco-cellulars of equal length, the lower discoidal from their point of junction. In the hindwing the upper disco-cellular is outwardly oblique, the lower perpendicular. In *C. pandava*, Horsfield, the first subcostal nervule of the forewing is quite free from the costal nervure and does not touch it as in the typical species.

I can recognise three distinct and well-marked species in this genus. *C. strabo*, Fabricius, is lilac-blue in the male on the upperside in typical specimens, but it occasionally has a "sport" or aberration which is greyish silvery-blue (*lithargyria*). *C. cnejus*, Fabricius, is equally distinct, the male of a deeper colour on the upperside, more purple than blue, with two instead of one black marginal ocellus at the anal angle of the hindwing. This appears to be a very variable species, Messrs. Butler and Swinhoe recognising six distinct forms of it, none of which are in my opinion worthy of specific rank. Lastly, *C. pandava*, Horsfield, is quite distinct, but has a well-marked seasonal form occurring in the dry weather, which at once reminds one of the corresponding form of *Chilades laius*, Cramer, in that the hindwing on the underside has all the discal markings run together into a large dusky patch.

The transformations of all three species are known, but of two only have they been described. The larvæ and the pupæ are of the usual lycænid form; all the larvæ have the extensile organs on the twelfth segment, and are attended by ants.

I do not know of the occurrence of any species of the genus in Europe, but it is found in Africa, near Aden, in Persia, and throughout the Indian region, the Malay Peninsula and Archipelago, in China, in Australia, and in the South Sea Islands.

Key to the Indian species of Catochrysops.

A. Both sexes with a distinct small dusky costal spot between disco-cellular and discal bands on underside of forewing; eyes hairy.
- *a.* Male, upperside lilac-blue.
  - 743. C. STRABO, India, Ceylon, Malayana, Andaman and Nicobar Isles, China, Australia.
- *b.* Male, upperside greyish silvery-blue, female unknown.
  - 744. C. LITHARGYRIA, Ceylon, Andaman Isles, Burma, Upper Assam, Philippines.

B. Both sexes with no dusky costal spot on underside of forewing; eyes smooth.
- *a.* Male, upperside with two nearly equal-sized black spots at anal angle of hindwing.
  - 745. C. CNEJUS, India, Ceylon, Andaman and Nicobar Isles, Malayana, China, Australia, South Sea Islands.
  - 746. C. THESEUS, Bombay.
  - 747. C. ELLA, Western India, Punjab, Central India.
  - 748. C. CONTRACTA, Kandahar, Karachi, Kutch, Madras.
  - 749. C. HAPALINA, Punjab, Deccan, Central India.
- *b.* Male, upperside with one large black spot at anal angle of hindwing.
  - 750. C. PANDAVA, India, Ceylon, Andaman and Nicobar Isles, Burma, Malay Peninsula, Java, Bantam.
  - 751. C. NICOLA, Bombay.

743. **Catochrysops strabo,** Fabricius.

Hesperia strabo, Fabricius, Ent. Syst., vol. iii, pt. 1, p. 287, n. 101 (1793); *Polyommatus strabo*, Godart, Enc. Méth., vol. ix, p. 656, n. 134 (1823); *Catochrysops strabo*, Boisduval, Voy. Ast., Lep., pt. 1, p. 88, n. 2 (1832); id., Moore, Lep. Cey., vol. i, p. 91, pl. xxxvii, figs. 2, *male*; 2a, *female* (1881); idem, id., Proc. Zool. Soc. Lond., 1882, p. 246; id., Distant, Rhop. Malay., p. 224, n. 1, pl. xxi, figs. 8, *male*; 14, *female* (1884); *Lampides strabo*, Butler, Cat. Fab. Lep. B. M., p. 165, n. 14 (1869); *Cupido strabo*, Druce, Proc. Zool. Soc. Lond., 1874, p. 106, n. 3; *Lycæna strabo*, Snellen, Tijd. voor Ent., vol. xix, p. 152, n. 46 (1876); *Lycæna kandarpa*, Horsfield, Cat. Lep. E. I. C., p. 82, n. 17 (1829); id., Moore, Proc. Zool. Soc. Lond., 1865, p. 773; *Lampides kandarpa*, Semper, Journ. Mus. Godef., vol. xiv, p. 158, n. 62 (1879); *Lycæna asoka*, Kollar in Hügel's Kaschmir, vol. iv, pt. 2, p. 419, n. 3 (1848); *L. didda*, id., l. c., p. 420, n. 5; *L. platissa*, Herrich-Schäffer, Stett Ent. Zeit., vol. xxx, p. 74, n. 31, pl. iv, fig. 20, *female* (1869); idem, id., Ex. Schmett., vol. ii, fig. 122, *female* (1869).

HABITAT: Throughout India, Ceylon, Burma, Malay Peninsula, Siam, Nias, Andaman and Nicobar Isles, Java, Borneo, Celebes, Philippine Isles, Formosa, Hainan, Australia.

EXPANSE; ♂, 1·10 to 1·50; ♀, 1·10 to 1·45 inches.

DESCRIPTION: "MALE. UPPERSIDE, *both wings* pale violet-blue, with a rich silvery reflexion, assuming in a certain light a dusky grayish shade, the colour being uniformly distributed over the whole surface; surrounded with a delicate black marginal thread, and an extreme grayish *cilia*. *Hindwing* marked exteriorly to the caudal appendage with an ocellate spot of a deep black colour, surrounded anteriorly with a pale blue lunule; a very faint transverse brown marginal bar, bordered with white, occupies in some individuals the space between this ocellus and the extreme anal angle. UNDERSIDE, *both wings* pale whitish-gray, and marked with catenulated bands, consisting each of two parallel undulated marginal threads of a brilliant white, including a broader fascia of a somewhat deeper shade than the ground-colour; three white strigæ pass in both wings parallel with the posterior [outer] margin, the exterior one is obsolete and bounded by a brown marginal thread, the two next are waving, and include two undulated bands of the ground-colour resembling the adjoining catenulated bands. *Forewing* with a short fascia placed transversely on the disc, the next [fascia] posteriorly extends entirely across the surface; the exterior [costal] margin has in the middle a minute ocellate spot with a white annulet. *Hindwing* with three similar fasciæ disposed in succession transversely on the disc, the anterior one is composed of two narrow interrupted portions, the second is short and stands transversely on the disc, the third is irregular and extends in an interrupted course entirely across the wing, and in the anal region is suddenly inflected and composed of short arcs; the exterior margin has, near the costa, two ocelli, separated by a small intervening space; in the anal region there are four ocelli, the exterior one, near the caudal appendage, is very large, nearly round, of a deep black colour, abruptly truncated and ornamented posteriorly with a streak of golden irrorations, and surmounted interiorly and at the sides with a large rufous crescent; the remaining ocelli are narrow and obscure, the interior one consists of a small dot at the extreme anal angle, and the intermediate ones are ovate and united into a reniform spot, the penultimate one being ornamented with a streak of metallic irrorations; along their inner edge passes a white streak, and interiorly of this a faint waving rufous band. The *thorax* and *abdomen* agree above and underneath, in colour with the wings; the *eyes* are bordered, the *tail* is tipt with white, and the *antennæ* are marked with white bands. FEMALE. UPPERSIDE, *both wings* have a broad brown border, the blue colour being brighter than in the male, covered with a silvery gloss, confined to the base in the hindwing, but spreading also over the disc in the forewing. *Hindwing*, the margin bears a series of ocellate spots, increasing in intensity of tint towards the caudal appendage, where the ocellus is intensely black and surrounded interiorly by a rufous crescent, the remaining ocelli have narrow white semilunar borders within and transverse marginal lines without; a series of lunular white marks passes regularly along the inner border of the marginal ocelli, and a few obscure spots form an irregular arch across the disc." UNDERSIDE, *both wings* as in the male. (*Horsfield*, l. c.)

The transformations of this species do not appear to have been recorded. In the plains I have found it most commonly about plants of dhal, and I think it probable that the larva feeds on that

plant. Mr. W. C. Taylor informs me that it feeds in Orissa on a plant named *Dolichos catjang*, Roxburgh, which is also one of the food-plants of *C. cnejus*, Fabricius.

Little need be said regarding the distribution of this common species, as it seems to occur almost everywhere from the lower and outer ranges of the Himalayas to Ceylon and Singapore, and in the Andaman and Nicobar Isles. Throughout its Indian range *C. strabo* appears to be very constant in coloration and markings if the next species is considered to be distinct. Mr. W. H. Irvine writes to me that at Bholahât, Malda, he once took *C. strabo* coupled with *C. cnejus*, Fabricius.

744. Catochrysops lithargyria, Moore.

Lampides lithargyria, Moore, Ann. and Mag. of Nat. Hist., fourth series, vol. xx, p. 340 (1877); idem, id., Lep. Cey., vol. i, p. 91 (1881); id., Butler, Ann. and Mag. of Nat. Hist., fifth series, vol. xvi, p. 336, n. 73 (1885); id., Elwes and de Nicéville, Journ. A. S. B., vol. lv, pt. 2, p. 429, n. 97 (1886).

HABITAT: Ceylon (*Moore*); near Assam (*Butler*); Tavoy (*Elwes* and *de Nicéville*); Andaman Isles; Philippines.

EXPANSE: ♂, 1·2 to 1·5 inches.

DESCRIPTION: "MALE. UPPERSIDE, *both wings* greyish silvery-blue, with a very narrow marginal black border. *Hindwing* with two triangular spots from the anal angle *Cilia* white, with dusky marginal inner line. UNDERSIDE, *both wings* white. *Forewing* with a broad greyish-brown spot at the end of the cell, a transverse discal maculated band with a contiguous spot at the upper end, a narrower submarginal band, and very indistinct marginal lunules. *Hindwing* with two prominent black costal spots, two greyish-brown subbasal spots, a broad spot at the end of the cell, a curved discal macular band, a marginal series of lunular spots enclosed by a broad dentate band, the penultimate spot being black and bordered above with ochreous."

"Allied to *L. kandarpa*, Horsfield [= *C. strabo*, Fabricius], also from Ceylon, but of an entirely different colour above and beneath, and the markings of the underside all much broader. Also allied to *L.* [= *C.*] *platissa*, Herrich-Schäffer, from Australia." (*Moore*, l. c. in Ann and Mag. of Nat. Hist.) Herr Georg Semper no doubt correctly states that the last-named species is also a synonym of *C. strabo*.

"Is this really a species distinct from *C. strabo*, Fabricius? It only differs in the shade of colour of the upperside, *C. strabo* being 'lilac-blue,' *C. lithargyria* 'greyish silvery-blue.' The two always appear to occur together, and the female of the latter species is even now undescribed." (*Elwes* and *de Nicéville*, l. c.)

I have but little to say regarding this species, the specific distinctness of which is, in my opinion, very questionable. Besides the localities given for it above, the Indian Museum, Calcutta, has two specimens from Sibsagar in Upper Assam, one from Mergui taken by Dr. J. Anderson in December, and one from the Andaman Isles. I possess a single example from the Philippines sent me by Herr Semper.

745. Catochrysops cnejus, Fabricius.

Hesperia cnejus, Fabricius, Ent Syst., Suppl., p. 430, n. 100-101 (1798); *Polyommatus cnejus*, Godart, Enc. Méth., vol. ix, p 657, n. 135 (1823); *Lycæna cnejus*, Horsfield, Cat. Lep. E. I. C., p. 83, n. 18 (1829); id., Moore, Proc. Zool. Soc. Lond., 1865, p. 773; id., Herrich-Schäffer, Ex. Schmett., vol. ii, fig. 120, *female* (1869); *Lampides cnejus*, Butler, Cat. Fab Lep B. M., p. 165, n. 13 (1869); id., Semper, Journ. Mus. Godef., vol. xiv, p. 158, n. 61 (1879); *Cupido cnejus*, Druce, Proc. Zool. Soc. Lond., 1873, p. 348, n. 7; *Catochrysops cnejus*, Moore, Lep. Cey., vol. i, p. 92 (1881); id., Butler, Proc. Zool. Soc. Lond., 1881, p. 605, n. 15; id., Moore, l. c., 1882, p. 246; id., Distant, Rhop. Malay., p. 225, n. 2, pl. xxi, fig. 2, *male* (1884); p. 456, n. 2, pl. xliv, fig. 15, *female* (1886); *C. cneius*, Doherty, Journ. A. S. B., vol. lv, pt. 2, p. 133, n. 170 (1886); *Lycæna pandia*, Kollar, Hügel's Kaschmir, vol. iv, pt. 2, p. 418, n. 2 (1848); *L. patala*, id., l. c., p. 419, n. 4; *Lampides patala*, Butler, Trans. Linn. Soc. Lond., Zoology, second series, vol. i, p. 547, n. 1 (1877); *Catochrysops patala*, id., Proc. Zool. Soc. Lond., 1883, p. 148, n. 14; id., Swinhoe, l. c., 1885, p. 131, n. 53; idem, id., l. c., 1886, p. 426, n. 38; *Lycæna samoa*, Herrich-Schäffer, Stett. Ent. Zeit., vol. xxx, p. 37, n. 30, pl. iv, fig. 18, *female*; also page 138 (1869).

HABITAT: Throughout India, Ceylon, Burma, Malay Peninsula, Nias, Andaman and Nicobar Isles, Sumatra, Java, Borneo, Celebes, Philippines, China, Australia, South Sea Islands.

EXPANSE: ♂, ♀, ·8 to 1·4 inches.

DESCRIPTION: "MALE. UPPERSIDE, *both wings* uniformly pale violet-blue, with a narrow grayish-brown posterior [outer] border, and two oblong black spots in the anal region, within [on either side of] the caudal appendage. UNDERSIDE, *both wings* gray with a faint Isabella-yellow shade; marked on the disc with a short transverse stigma, which in the hindwing is slightly curved. *Forewing* has three ranges of catenulated bands of a brown colour, of which the two exterior are parallel with and adjoining the posterior margin, being confined by the marginal strigæ; the third, in which the catenulated character is more distinctly exhibited, is intermediate between the marginal series and the disc; this is continued through the *hindwing*, where it is more curved and somewhat irregular and infracted in its course; in the marginal series of ocellate spots, the interior ones form two strongly-marked anal ocelli; these are regularly round, nearly equal in size and brilliancy of tint, intensely black, encircled by a pale orange iris, bordered internally by a ring of yellow metallic irrorations, which is partially interrupted at the internal edge: the hindwing has further, four ocellate spots of an intense black colour with white iris, three of these are placed in a transverse series at the base, and a third, somewhat larger and more vivid, in the middle of the anterior margin close to the costa. *Thorax* above has a bluish cast and is covered with delicate hairs; *abdomen* brown, underneath agrees in colour with the wings; *thorax* underneath and *legs* covered with a delicate pure white down; *antennæ* banded with white. FEMALE. UPPERSIDE, *both wings* with a deep brown border; a light blue tint with a bright silvery reflexion is, in the hindwing confined to the base, in the forewing expanded to the disc, but entirely evanescent in a certain position towards the light. *Hindwing*, posterior border bearing a series of dark ocellate spots, of which two, at the anal angle, are of a deeper tint and surrounded internally with bright rufous crescents; the penultimate ocellus exceeds the last in size and brilliancy of colour; all these ocelli are abruptly truncated behind, and the exterior ones are surrounded internally with narrow white crescents; a row of angular or wedge-shaped marks of a brilliant white, having the points directed towards the disc, passes along the inner edge of the marginal series. UNDERSIDE, *both wings* like the male. *Cilia* throughout in both sexes gray." (*Horsfield*, l. c.)

LARVA when full-fed about half an inch in length, green, of the usual lycænid shape, the head small, black, shining, retractile as usual. Colour of body pale green, with darker green or reddish dorsal and subdorsal lines, often with short oblique lines one on each segment on each side between the dorsal and subdorsal lines, the latter coalesced into a broad band between the eleventh and last segments. The entire surface of the body covered with minute white tubercles, there are also a few scattered white hairs. The segmental constrictions shallow. Spiracles black. Extensile organs on the twelfth segment small. The larva is broader than high in its highest part, increasing in width to the fourth segment, from thence to the flattened anal segment of about uniform width. Bred by me in Calcutta on *Phaseolus trilobus*, Linnæus. Mr. W. C. Taylor reports that the larva feeds in Orissa on *Dolichos catjang*, Roxburgh. Dr. A. Forel identifies the ant which attends the larva in Calcutta as *Camponotus rubripes*, Drury (= *sylvaticus*, Fabricius), subspecies *compressus*, Fabricius. PUPA very pale green, the abdominal segments somewhat opaque, of the usual lycænid shape, no distinctive structure or markings. Headcase somewhat square, thorax slightly humped, slightly constricted before the first abdominal segment, a dark dorsal line extending the whole length, spiracles black, entire surface smooth, not hairy. Mrs. Wylly has furnished me with the following description of the preparatory stages of *C. cnejus*. "Larva one half to three quarters of an inch long, onisciform, flattened at the tail and narrower; yellowish-green in colour, with brownish-red spots down the dorsal line. Some of the larvæ are darker red-brown, and some uniform pale green. The food-plant is an edible bean growing in the rains, with clusters of bluish flowers, vernacular names, Bargara (Uriah), Barbati (Bengali), the *Dolichos catjang* of Roxburgh. Larvæ are attended by black ants of the larger species, in the same way as are the larvæ of *Tarucus theophrastus*, Fabricius. Both species have the power of

emitting some agreeable odour or juice from the small movable horns situated on the upperside near the tail. These horns are capable of being projected and retracted at pleasure. As I have found the pupæ of *T. theophrastus* in ants' nests, probably the pupæ of *C. cnejus* are also guarded by the ants in their nests, as well as attached to the undersides of leaves. The larvæ of *C. cnejus* are found entirely on the young green clusters of buds and flowers."

As little need be said about the general distribution of this species as about that of the species which precedes it It is perhaps not quite as common where it occurs, but has a slightly greater recorded range, as Herr Semper states that it is found on Kajoa, one of the South Sea Islands. In my opinion it is subject to great seasonal and climatic variation, so much so indeed, that Mr. Butler admits five distinct species of the group, none of which are, in my opinion, entitled to specific rank.

The next four species, all of which have been described by Mr. Butler and Colonel Swinhoe, in whose writings alone references to them are to be found, are in my opinion either "sports," seasonal forms, or inconstant local races of *C. cnejus*. I think the table below of the specimens of these species from various localities in Colonel Swinhoe's collection will help to show this ; in the one locality of Mhow, he gives five distinct species of this group, in Karachi, four, and in Poona and Bombay, three :—

Mhow.	*cnejus.*	*patala.*	*ella.*	*contracta.*	*hapalina.*	
Karachi.	*cnejus.*	*patala.*	*ella.*	*contracta.*		
Poona.	*cnejus.*	*patala.*			*hapalina.*	
Hubb river.			*ella.*	*contracta.*		
Bombay.	*cnejus.*	*patala.*				*theseus.*
Hyderabad.			*ella.*	*contracta.*		
Kadgodi.	*cnejus.*			*contracta.*		

I have given below the original descriptions of all these species with the exception of *C. patala*, Kollar, with regard to which I follow Mr. Distant, who places it as a synonym of *C. cnejus*. As so many species of this group have of late been discriminated, it is probably impossible without examining the type specimen to say exactly what *C. patala* is.

746. Catochrysops theseus, Swinhoe.

C. theseus, Swinhoe, Proc. Zool. Soc. Lond., 1885, p. 131, n. 55, pl. ix, fig. 8, *male*.

HABITAT : Bombay, October.

EXPANSE : ♂, 1·2 inches.

DESCRIPTION : " MALE. UPPERSIDE, *both wings* like *C. cnejus*, Fabricius. *Cilia* grey on the forewing. UNDERSIDE, *both wings* greyish-white, markings greyish-brown, marginal line brown, submarginal and discal macular lines arranged as in *C. hapalina*, Butler, but the markings broader, the spots running into each other forming two almost clear bands ; all the markings surrounded by whitish. *Hindwing* with a subcostal black spot near the base and another below it, a lunular streak at the end of the cell, two black spots on an orange ground near the anal angle ; border greyish-brown ; submarginal and discal whorl of markings as in *C. cnejus*, but darker, broader, and running into each other, almost forming bands ; the discal band commencing with a longitudinal subcostal deep black streak." (*Swinhoe*, l. c.)

I have not seen this species, and strongly suspect that it is an aberration or sport.

747. Catochrysops ella, Butler.

C. ella, Butler, Proc. Zool. Soc. Lond., 1881, p. 606, n. 17 ; idem, id., l. c., 1886, p. 365, n. 37 ; id., Swinhoe, l. c., 1884, p. 506, n. 21 ; idem, id., 1886, p. 426, n. 40 ; idem, id., Journ. Bomb. Nat. Hist. Soc., vol. ii, p. 273, n. 22 (1887).

HABITAT : Karachi, December and January ; Campbellpore, 21st November, 1885 (*Butler*) ; a few specimens taken at Karachi in December and January ; Mhow, September to November ; Karachi common (*Swinhoe*).

EXPANSE : ♂, ·83 ; ♀, 1·0 inch.

DESCRIPTION : " Allied to *C. cnejus*, Fabricius, but with the coloration of the wings on the underside more like *C. pandava*, Horsfield. MALE. UPPERSIDE, *both wings* lilac,

greenish at the base, with a broad dark brown border twice as wide at apex as towards the external angle. *Hindwing* with a black marginal line and a submarginal series of six ocelloid spots, less distinct in the male than in the female, the first indistinct, the three following brown with white borders, the fifth large, black, with the border white externally and orange internally, anal spot bifid, black with white border; *tail* black tipped with white. UNDERSIDE, *both wings* brownish-grey, with the spots arranged as in *C. cnejus*, but broader, less prominent; the submarginal spots relieved internally by a rather broad brown border, beyond which is a diffused discal white streak or band; the black ocelli towards the anal angle vary in extensity, and sometimes are almost wholly lost, as in the male before me. FEMALE. UPPERSIDE, *both wings* lilac, greenish at the base, with a blackish marginal line and indistinct ocelloid submarginal spots. *Hindwing* as in the male, but the submarginal series of six ocelloid spots more distinct than in the male, the first indistinct. UNDERSIDE, *both wings* as in the male. *Cilia* white throughout in both sexes." (*Butler*, l. c. in Proc. Zool. Soc. Lond., 1881). From *C. hapalina*, Butler, it is at once distinguished by "its brighter colouring above and smoky-grey underside." (*Butler*, l. c. in Proc. Zool. Soc. Lond., 1886).

"*C. ella* is a brilliantly blue species, with a broad black border to the forewing in the male; it can readily be recognised from its vague resemblance to some of the species of *Jamides* (*J. plato* [=*J. bochus*, Cramer] for instance); it is not quite so brilliantly coloured, though brighter than any other *Catochrysops*." (*Butler*, Ann. and Mag. of Nat. Hist., sixth series, vol. i, p. 145 (1888).

I have rearranged the sentences of the original description, which is difficult to follow as it stands, the writer having mixed up the opposite sexes. In Colonel Swinhoe's collection are twenty-two specimens supposed to belong to this species, but they do not agree with the description of it. Mr. Butler says "male with a broad dark brown border twice as wide at apex as towards the external angle." This is quite inexplicable to me, the males of every species of this genus have a narrow outer black margin of equal width throughout to the forewing on the upperside, and I can only surmise that he has described two female specimens as male and female, unless Colonel Swinhoe's specimens are wrongly identified, or Mr. Butler had a butterfly before him when he wrote entirely different from every known species in the genus. Again, hindwing of the male on the upperside with "a submarginal series of six ocelloid spots." I can find no male *Catochrysops* exhibiting this feature, but the spots are more or less present in all females. Then, on the underside the spots are said to be broader than in *C. cnejus*. As *C. ella* is considerably smaller than typical *C. cnejus* the spots would naturally be smaller too. I cannot identify the species by the description, and can only surmise that it is a dwafted form of *C. cnejus* occurring in the arid region of Sind and the Punjab. Colonel Swinhoe's specimens are from the Hubb river in Biluchistan, Karachi, Mhow, Madras, Bisnuggur in Guzerat, and Hyderabad in Sind. They show the greatest variation, and, if all these species of *Catochrysops* allied to *cnejus* are to be kept distinct, certainly represent several more of such species.

748. **Catochrysops contracta**, Butler.

Lampides contracta, Butler, Proc. Zool. Soc. Lond., 1880, p. 406, n. 10, pl. xxxix, fig. 3, *male*; *Catochrysops contracta*? Butler, Proc. Zool. Soc. Lond., 1881, p. 606, n. 16; id., Swinhoe, l. c., 1884, p. 506, n. 20.

HABITAT: Kandahar, Kutch (*Butler*); Karachi, Madras (*Swinhoe*).

EXPANSE: ♂, ·92; ♀, ·83 of an inch.

DESCRIPTION: "MALE. UPPERSIDE, glossy lilac, the *body* dark grey, with the *head* and sides of *abdomen* white, *antennæ* black annulated with white. *Both wings* with a slender black marginal line, *cilia* white; base of wings bluish; costal border of *forewing* pale bluish from the base to the end of the cell. *Hindwing* with a brownish costal border; two black spots, the inner one bifid, above the tail, succeeded by a slender white line; *tail* black tipped with white. UNDERSIDE, *both wings* very pale whitey-brown, with a white-bordered pale brown elongated spot at the end of each cell, followed by a discal series of similar spots, interrupted in the hindwing; a marginal series of white and brown ocelloid spots of the usual form;

Hindwing with three black spots above the tail at the anal angle, with two outer ones large, zoned with orange and varied with metallic golden green, the outermost spot extremely small; two subcostal black spots and a third within the cell. *Body* below white. FEMALE. UPPERSIDE, *both wings* pale brown, with a slender black marginal line followed by a brown line. *Cilia* white. *Forewing*, washed towards base of interno-median area with silvery blue. *Hindwing* with a series of six ocelloid spots close to outer margin—the first indistinct; the first four brown with white borders; the fifth large, black, with orange inner and white outer border; the sixth bifid, black with bluish inner and white outer border; *tail* black, tipped with white. *Body* browner than in the male. UNDERSIDE slightly browner than in the male; otherwise the same."

"Allied to *L.* [= *C.*] *cnejus*, Fabricius; but constantly smaller and of an entirely different colour, the upperside of the male being altogether blue and the underside whiter; the female is also paler; the pattern of the underside is very like that of *Lycæna galba* [from Beirut, Persia] as figured by Lederer. Mr. Moore has a series of *L. contracta* from Kutch." (*Butler*, l. c.)

"Rare in Kandahar in May, very common in June, not so variable in size as *L. bœtica*, Linnæus, and much smaller." (*Roberts*, l. c.)

"I believe this form to be only a seasonal variety of *C. cnejus*; but Mr. A. G. Butler, whose authority is much to be respected, thinks otherwise. I tried to breed them, but failed." (*Swinhoe*, l. c. in Proc. Zool. Soc. Lond., 1884, p. 506.)

"Common in Karachi from May to September. Butler's type came from Kandahar; the Karachi examples are identical with the Kandahar form." (*Swinhoe*, Journ. Bomb. N. H. Soc., vol. ii, p. 273, n. 21 (1887).

In Colonel Swinhoe's collection are twenty-five specimens he identifies as this species from the Hubb River in Biluchistan, Karachi, Hyderabad in Sind, Mhow, and Kadgodi. The males show great variation in the shade of coloration of the upperside, some being quite blue, others almost as violet-blue as in typical *C. cnejus*. In my opinion it is a variable dwarfed form of *C. cnejus* only, and not entitled to specific rank.

749. **Catochrysops hapalina**, Butler.

C. hapalina, Butler, Proc. Zool. Soc. Lond., 1883, p. 148, n. 15, pl. xxiv, figs. 2, *male*; 3, *female*; id., Swinhoe, l. c., 1885, p. 131, n. 54; idem, id., l. c., 1886, p. 426, n. 39; id., Butler, Ann. and Mag. of Nat. Hist., sixth series, vol. i, p. 145, n. 41 (1888).

HABITAT: Mhow, September to January; Campbellpore, September and October; Poona, January to May; Khairabad, April; Hurripur, October.

EXPANSE: ♂, 1·05; ♀, 1·10 inches.

DESCRIPTION: "MALE. Allied to *C. ella*, Butler. UPPERSIDE, *both wings* pale lilac with strong pale golden-brown reflections, which sometimes almost overpower the lilac tint; base of wings blackish and blue; a slender blackish marginal line. *Cilia* white. *Hindwing* with a short and very slender black tail edged with white; two white-bordered black spots near the anal angle. *Body* blackish. UNDERSIDE, *both wings* greyish-white, with faint golden tints in certain lights; markings as in *C. patala*, Kollar, but less distinct; the two anal ocelli small, with no metallic scales in the type; the female, however, and such specimens of both sexes as are darker and bluer than the type above, have a metallic annulus of green on each ocellus; one male taken in January has this annulus of bright gold. FEMALE. UPPERSIDE, *both wings* blackish. *Forewing* with the exception of a broad apical patch tapering to beyond the middle of the costal border and a broad external border, suffused with bluish-lilac. *Hindwing* with the basal three-fifths, excepting towards the costa, of the same colour bounded externally by a narrow band of white spots; five submarginal black spots with white borders, those of the last two touched at the back with orange and bluish scales; otherwise almost exactly as in the male."

"This species may readily be distinguished from *C. ella* by the whiter tint of the underside, and the arrangement of the spots in the transverse series across the disc of the

forewing, which are placed end to end in a straight line instead of angle to angle; this arrangement brings the last of the series much nearer to the external angle."

"What I can only regard as a dwarfed form of this species occurs commonly at Mhow in December and January. Colonel Swinhoe, however, goes further than I do, and thinks that this and other allied forms are all seasonal varieties of *C. cnejus*; he probably means *C. patala*, since *C. cnejus* has the spots across the disc of the forewing below arranged angle to angle as in *C. ella*. Colonel Swinhoe further remarks that this small form (of *C. hapalina*) is as beautifully coloured as my *C. contracta*; and observes, 'Certainly the *C. contracta* from Madras are really very beautifully coloured; but then, again, the most beautifully coloured *C. cnejus* comes from Madras also—a moist part of India where all bluish-coloured butterflies are very beautiful.'"

"*C. contracta*, as far as my knowledge goes, is confined to Kandahar: the markings of the underside are different in character from those of either the *C. patala* or *C. cnejus* groups; the spots of the discal series form a broken line, the upper part regular, the lower irregular. Unless such differences are admitted as of specific value, many of the best-established and hitherto universally admitted species will have to be united—an action to which few, if any, careful students of the Lepidoptera will give their sanction." (*Butler*, l. c.)

"Common at Mhow in December, but one or two found in October, November and January." (*Swinhoe.*)

Major Yerbury records it as "common on babul-bushes in October" at Campbellpore. Mr. Butler records it from Khairabad, 11th April; Campbellpore, 11th September and 21st October; Hurripur, 14th October.

In Colonel Swinhoe's collection are twelve specimens he identifies as *C. hapalina*, from Alibagh and Mhow, and eight more which he considers to be a variety of that species from Mhow and Poona. The distinctions between this species and *C. cnejus* are so extremely slight that I cannot consider them to be of specific value: all the markings of the underside are less defined and duller and the insect is smaller, that is all; these are differences due to a dry climate, and not improbably are of a seasonal nature as well.

750. **Catochrysops pandava**, Horsfield.

Lycæna pandava, Horsfield, Cat. Lep. E. I. Co., p. 84, n. 19 (1829); *Catochrysops pandava*, Moore, Lep. Cey., vol. i, p. 92, pl. xxxvii, fig. 1, *male*; 1*a*, *female*; 1*b*, *larvæ* and *pupa* (1881); id., Distant, Rhop. Malay., p. 225, n. 3, pl. xxi, fig. 17, *male* (1884); id., de Nicéville, Journ. A. S. B., vol. liv, pt. 2, p. 47, n. 74 (1885); *C. bengalia*, id., l. c., n. 75.

HABITAT: Himalayas, Oudh, Bengal, Assam, Orissa, North Kanara, Bangalore, Pulni Hills, Ceylon, Andaman and Nicobar Isles, Burma, Malay Peninsula, Java, Bantam.
EXPANSE: ♂, ♀, ·9 to 1·3 inches.

Wet-season form. (PLATE XXVII, FIG. 187 ♀).

DESCRIPTION: "MALE. UPPERSIDE, *both wings* bright lavender-blue. *Forewing* with the outer margin fuscous. *Hindwing* with the costal margin fuscous, the outer margin with a series of blackish spots placed between the nervules, between which and the narrow black margin is a slightly undulating white line. *Tail* blackish, with its apex white. *Cilia* of both wings fuscous, the tips greyish-white. UNDERSIDE, *both wings* pale greyish-brown, with the following narrow greyish-white linear fasciæ arranged in pairs, and between which the colour is distinctly darker:—*forewing* with two disco-cellular at the end of the cell, followed outwardly by two crossing the wing from near the fourth subcostal nervule, which are abruptly broken and deflected inwardly beneath both the second and first median nervules, two broad submarginal and one narrow marginal: *hindwing* with two disco-cellular at end of cell, two crossing wing broken and deflected at the lower subcostal and median nervules, two lunulated and submarginal, and one straight marginal, the last coalescing with the outer submarginal and thus enclosing a series of dark spots, a large black marginal spot with a few greenish scales between the second and first median nervules, and some smaller spots of the same colour at the anal angle;

these spots inwardly margined with reddish-ochraceous, which colour is also slightly continued between the third and second median nervules; five black spots surrounded with greyish-white, situated two between the costal [and subcostal] nervures, one in the cell, one between the bases of the first median nervule and the submedian nervure, and one (smaller) near the base of the abdominal margin. *Body* and *legs* more or less concolorous with the wings." (*Distant*, l. c.) "FEMALE agrees in size and in the markings of the UPPERSIDE of *both wings* generally with *C. cnejus*, Fabricius; a slight difference is afforded by the interior anal ocellus of the *hindwing*, which here consists of two narrow, oblong, confluent spots, without rufous lunule, but bounded interiorly by an emarginate white line; the wedge-shaped marks along the inner border are replaced by a transverse series of lunules. UNDERSIDE, *both wings* yellowish-gray, with a very faint shade of brown; in the number and disposition of the markings it also resembles *C. cnejus*, but it possesses a distinguishing peculiarity in the brilliancy of the white marginal strigæ and in the greater breadth and deeper shade of the brown bands producing a striking contrast of colours: on the disc of both wings stands a short transverse stigma; behind this follows a broad catenulated band, regular in the forewing, with a few inflexions at the inner margin, but interrupted and irregularly curved in the hindwing; the marginal white strigæ, three in number, are strongly pronounced; the most exterior passes without undulations, in contact with the brown marginal thread, through, both wings; the two anterior strigæ are waving in the forewing and flexuose in the hindwing, embracing two series of catenulated bands, composed of oblong spots in the former, and of angular ones in the latter. *Hindwing* has the posterior margin adorned with two anal ocelli; the largest being placed exterior of the caudal appendage, and the other in the space towards the anal angle; an obscure black dot stands between them and another at the extreme angle of the wing; the exterior ocellus is covered internally by a very broad rufous arc, slightly notched at each side; a rufous streak is continued to the inner margin, being of a more saturated tint above the interior ocellus; a small exterior lunule of golden irrorations, adorns the large ocellus, and the small ocellus has on the margin an interrupted golden ring; there are five black spots encircled with white on the anterior portion of the hindwing; two of these, of a more saturated tint, stand in contact with the costa, the remaining form a transverse basal row, the penultimate spot being rather obsolete. The *tail* is slender and tipt with white; the *antennæ* brown with white rings and tip; the *thorax* and *body* are brown above and gray underneath, the former being covered with a bluish down and the latter annulated with white." (*Horsfield*, l. c.)

The figure shows both sides of a female specimen of the wet-season form from Bangalore in my collection.

Dry-seasan form. (PLATE XXVII, FIG. 188 ♀).

DESCRIPTION: "MALE. UPPERSIDE, *both wings* violet-blue. *Cilia* dusky. *Forewing* with the outer margin narrowly black. *Hindwing* with a marginal series of dusky oval spots, the third from the anal angle larger, black and round; an anteciliary black line; tail dusky with a white tip. UNDERSIDE, *both wings* grey. *Cilia* grey spotted with dusky. *Forewing* with a white-bordered brownish spot closing the cell, a curved discal series of joined similar spots, two series of marginal lunules, a black anteciliary line. *Hindwing* with four subbasal dusky spots surrounded with white; a much curved discal series, the upper spot on the costa usually the most prominent, and a spot closing the cell; marginal lunules much as in the forewing, but more prominent; a small black spot faintly crowned with orange in the first median interspace, and three very minute anal ones beyond it, all four sometimes absent. In some specimens the discal series of spots on the forewing are much elongated towards the middle of the wing, and in all the specimens I have seen, except two from Sikkim, the spots on the disc and the one closing the cell of the hindwing have coalesced, forming an irregular brown patch in the middle of the wing, which patch sometimes reaches and includes the subbasal spots. FEMALE. UPPERSIDE, *both wings* shining iridescent violet-blue. *Forewing* with the apex widely and the outer margin decreasingly black. *Hindwing* with the costal margin dusky. Otherwise as in the male."

"Near to *C. pandava*, Horsfield. Male smaller than that species, of a paler shade of blue; differing on the underside of the hindwing in the coalescing of the discal spots, and the anal spots being much smaller or absent altogether. The female on the upperside is of quite a different shade of blue, which colour reaches to the costa and is much nearer to the outer margin in the forewing, and covers all the hindwing except the costal margin. The marginal series of black spots are smaller, more regular in size, and the third from the anal angle not conspicuously crowned with orange as in *C. pandava*."

"I have taken numerous specimens of both sexes of this species in the cold weather in Calcutta, and the late Mr. G. Nevill took it at Moisraka. It occurs also rarely in Sikkim." (*de Nicéville*, l. c.) Since I described *C. bengalia*, I have carefully noted that it is only on the wing during the winter, and frequents the same Cicads which produce the wet-season form later on. I have no hesitation therefore in sinking *C. bengalia* as a seasonal form of *C. pandava*.

The figure shews both sides of a female example of the dry-season form in my collection from the Dehra Dun.

"LARVA. Onisciform; greenish or violet-brown above, with a dorsal darker brown line and white spots, and a yellow lateral line." (*Moore*, l. c). "Feeds on *Cycadaceæ*" (*Thwaites*). Larva when full-grown a little over half an inch in length, of two distinct colours, some being bright green, others of a dark reddish-purple (vinous). They are of the usual lycænid shape: the head very small, black, shining, and hidden beneath the second segment, the third segment larger than the second, the other segments of about equal size, the anal segment flattened and rounded, divisions between the segments well-marked. The larva throughout is very rough, widely pitted or depressed, and covered with very minute white tubercles bearing very short fine hairs, neither the hairs nor the tubercles being visible without a lens. The body at its highest and widest part is wider than high. It is extremely variable in markings, hardly any two being exactly alike; there is usually a dark dorsal, subdorsal and lateral line dividing the upper surface of the body into three equal areas, the dorsal and two subdorsal lines coalescing on the eleventh segment, and forming a broad band to the thirteenth. In some examples the divisions between the segments are marked with darker, and there is a subdorsal series of oblique dark lines one on each segment between the dorsal and subdorsal lines. The underside of the body and legs seem to be always pale green. The erectile organs on the twelfth segment very small. Feeds in Calcutta on *Cycas revoluta*. In Calcutta three species of ants attend this larva, which Professor Forel has identified for me as *Prenolepis longicornis*, Latreille, *Monomorium speculare*, Mayr, and *Cremastogaster*, n. sp.? "PUPA. Violet-brown, thick, head truncate." (*Moore*, l. c.) Pupa. Of the usual lycænid form, quite smooth, more or less fuscous, with a darker dorsal and subdorsal line, head-case somewhat square, thorax slightly humped and constricted posteriorly, spiracles pale. Though the larvæ swarm in April and May in Calcutta on the cultivated Cycads in gardens, eating the hardly-opened shoots or fronds, thereby utterly destroying the appearance of the plant for the year, I have never succeeded in finding the pupa on the plants, and can only conclude that the ants drive the full-grown larvæ down the stems of the plants into their nests, where the larvæ undergo their transformations. As far as I know, the Cycads are always cultivated garden plants in Calcutta, and I am not aware of any other plant on which *C. pandava* feeds; though it must I think eat other things, as in Sikkim it is a very common species at low elevations, and I have never seen a Cycad there.

C. pandava is a much rarer species usually than either *C. strabo* or *C. cnejus*, owing I fancy to the usual scarcity of its food-plant, though where the latter occurs, the butterflies often swarm. It has also not such a wide range as those species, and does not extend beyond the Indian region into China and Australia as they do.

751. Catochrysops nicola, Swinhoe.

C. nicola, Swinhoe, Proc. Zool. Soc. Lond., 1885, p. 132, n. 56.

HABITAT: Poona, December.

EXPANSE: ♀, 1·2 inches.

DESCRIPTION: "FEMALE. UPPERSIDE, *both wings* pale blue, with broad costal and outer black borders, deepest at the apex [of the *forewing*]. *Hindwing* with five marginal largish black spots surrounded by yellowish commencing near the anal angle, one in each interspace, with whitish streaks above each spot. UNDERSIDE, *both wings* pale greyish, markings greyish-brown surrounded by white, a streak at the end of each cell, a whorl of discal square spots, a row of marginal and submarginal square spots, the submarginal spots having a white band internally. [*Hindwing* with] a subbasal centre spot and three others below it in a line, and two black spots on an orange ground near the anal angle."

"This is closely allied to *C. pandava*, Horsfield, and may probably be only a local form of that species." (*Swinhoe*, l. c.)

In the above description Colonel Swinhoe does not say how many specimens he possesses of this "new species," he does not figure it, and the male is undescribed. Nor does he say how it differs from *C. pandava*, but from the description the five black marginal spots surrounded by yellowish on the upperside of the hindwing seem to be distinctive. I do not quite follow the "subbasal centre spot and three others below it in a line" on the underside of the hindwing. In *C. pandava* there is a prominent black spot near the middle of the costa, and four subbasal spots arranged nearly in a straight line across the wing, the uppermost one close to the costa, the lowest on the abdominal margin, the two in the middle of the wing near together.

Genus 122.—TARUCUS, Moore. (PLATE XXVII).

Tarucus, Moore, Lep. Cey., vol. i, p. 81 (1881).

"FOREWING, triangular; *costa* very slightly arched at base, *apex* slightly acute, *exterior margin* oblique and slightly convex, *posterior* margin straight; *costal nervure* short, not extending to half length of the margin; *first subcostal nervule* short, emitted at one-half before the end of the discoidal cell, anastomosed to the costal nervure near its end; *second* subcostal at one-third, and *third* subcostal at one-sixth before the end of the cell, *fourth* subcostal at one-half from third and terminating at the apex, *fifth* subcostal [*upper discoidal*] from the end of the cell; *disco-cellular* nervules slightly waved, radial [*lower discoidal*] nervule from their middle; *discoidal cell* long, broad; *second median nervule* emitted at one-fifth before the end of the cell, *first* median at more than half before the end; *submedian nervure* straight. HINDWING, bluntly oval; *exterior margin* convex, *anal angle* acute; with a slender *tail* from the end of the first median nervule; *costal nervure* much arched at the base, extending to the apex; *first subcostal nervule* emitted at one-half before the end of the cell; *disco-cellular* nervules inwardly oblique, *discoidal nervule* from their middle; *discoidal cell* short, broad; *second median nervule* emitted immediately before the end of the cell; *first* median at one-half before the end; *submedian nervure* straight, *internal* nervure recurved. BODY slender; *palpi* porrect, second joint projecting about one-third beyond the head, clothed with long lax scales; third joint slender, naked; *legs* slender; *antennæ* with a very long slender grooved club." *Eyes* smooth in *T. theophrastus* and allies, hairy in *T. plinius* and *T. telicanus*. "Type, *T. theophrastus*, Fabricius." (*Moore*, l. c.)

In the forewing the costal nervure is short, not reaching opposite to the apex of the discoidal cell; the first subcostal nervule is suddenly bent upwards towards the costal nervure soon after its origin, and in the males touches the costal nervure (does not anastomose with it as Mr. Moore says), in the females there is a small portion of wing-membrane between these two veins; the second subcostal has its origin slightly nearer to the base of the first than to the base of the upper discoidal; the third subcostal has its origin rather nearer to the base of the upper discoidal than to the apex of the wing; in *T. theophrastus* the middle and lower disco-cellular nervules are in a straight line, upright, and of nearly equal length; in *T. plinius* the middle disco-cellular is slightly outwardly oblique, the lower upright. In the hindwing Mr. Moore says the first subcostal nervule is emitted at one-half before the end of the cell, in *T. theophrastus* it is given off at hardly one-third, and in *T. plinius* at about one-fourth before the end; in *T. theophrastus* the disco-cellular nervules taken together are nearly upright, the upper slightly outwardly, the lower slightly inwardly, oblique; in *T. plinius*

they are rather more in a straight line; the second median nervule is given off sometimes immediately before, sometimes at, and sometimes immediately after, the end of the cell.

I have described thus carefully all the differences I can discover in the structure of *T. theophrastus* and *T. plinius*, as Mr. W. Doherty, whose opinion is entitled to respect, holds that the latter species should form the type of a genus distinct from *Tarucus*. The differences, however, are so slight, that I follow Mr. Moore in placing them both in one genus.

I have fully described the transformations of *T. theophrastus*, Fabricius, as observed in Calcutta, when describing that species.

Tarucus is a widely-distributed genus, occurring in Europe, North, West, and South Africa, Western Asia, Asia Minor, Persia, India, Ceylon, but not in the Andaman or Nicobar Isles, or the Malay Peninsula; one species, *T. plinius*, occurs in Western Africa, Aden, almost throughout India, Ceylon, Burma, Java, and in China. Two species occur in Europe. *T. balcanica*, Freyer, is found in Turkey, also in Western Asia and Persia, and is perhaps only a local race of *T. theophrastus*; the other, *T. telicanus*, Lang, in South Europe, North Africa, and Western Asia, and is allied to *T. plinius*. Omitting *T. plinius*, which is easily recognised, and belongs to a different group, six forms of *T. theophrastus* have been recorded from India, and are maintained as distinct species by Mr. Butler. I am able to recognise as satisfactorily distinct two only of these forms, *T. theophrastus* (which, however, Mr. Butler of late insists is not an Indian insect at all, but confined to North Africa and Aden, though in 1883 he recorded it from Mhow, but which I agree with most writers and observers in believing to occur everywhere almost in India and Ceylon), and *T. venosus*, which has as yet been found only in a corner of the Western Himalayas, in Kumaon, and in Malda. I can indeed separate and recognise specimens of all the other described forms, but I find by a careful study of my long series of specimens of this genus from all parts of India, that the characters given as representing specific differences are infinitely variable: they grade off one into another, and are quite unreliable. However, for facility of further study, I have given the descriptions of all these so-called species separately, and placed in the Habitat headings only those localities for each species which have been recorded by others.

Key to the Indian species of Tarucus.

A. Underside, forewing streaked and spotted, markings not arranged in alternate broad and narrow bands at right angles to costa.
  - *a.* Male, upperside, both wings with narrow black border to outer margin.
    - 752. T. THEOPHRASTUS, North Africa, Aden.
    - 753. T. NARA, Karachi, Western Himalayas, Punjab, Bombay, Deccan, Central India.
    - 754. T. CALLINARA, Upper Burma, various parts of India.
    - 755. T. ALTERATUS, Western Himalayas.
    - 756. T. EXTRICATUS, Karachi, Campbellpore, Landour.
  - *b.* Male, upperside, both wings with broad black border to outer margin.
    - 757. T. VENOSUS, Western Himalayas, Kumaon, Malda district.

B. Underside, forewing with markings arranged in alternate broad and narrow bands at right angles to costa.
    - 758 T. PLINIUS, Western Africa, Aden, India, Ceylon, Upper Burma, Java, China.

752. Tarucus theophrastus, Fabricius.

Hesperia theophrastus, Fabricius, Ent. Syst., vol. iii, pt. 1, p. 281, n. 82 (1793); *Polyommatus theophrastus*, Godart, Enc. Méth., vol. ix, p. 658, n. 139 (1823); *Lycæna theophrastus*, Lucas, Expl. Alg., Zool., vol. iii, p. 362, n. 47, Lép. pl. 1, figs. 6, 6*a*, *male*: 6*b*, *antenna* (1849); id., Horsfield, Cat. Lep. E. I. C., p. 73, n. 8 (1828); id., Horsfield and Moore, Cat. Lep. Mus. E. I. C., vol. 1, p. 25, n. 22 (1857); id., Trimen, Rhop. Afr. Aust., p. 241, n. 142 (1866);* id., Moore, Proc. Zool. Soc. Lond., 1865, p. 772; id., Lang, Butt. of Eur., p. 140 (1884); *Lampides theophrastus*, Butler, Cat. Fab. Lep. B. M., p. 164, n. 9 (1869); *Tarucus theophrastus*, Moore, Lep. Cey., vol. 1, p. 81, pl. xxxvi, fig. 3 (1881); id., Butler, Proc. Zool. Soc. Lond., 1883, p. 148, n. 13; idem, id., l. c., 1884, p. 484, n. 13; id., Swinhoe, Proc. Zool. Soc. Lond., 1885, p. 134, n. 71; idem, id., l. c., 1886, p. 428, n. 55; id., Doherty, Journ. A. S. B., vol. lv, pt. 2, pp. 112, 132, n. 159 (1886); *L. psittacus*, Allard, Ann. S. Fr., 1867, p. 313.

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* *L. theophrastus* is not included in Mr. Trimen's "South-African Butterflies," so probably the species was formerly incorrectly given as from South-Africa in the British Museum collection.

HABITAT : Morocco (*Fabricius*), Barbary and Egypt (*Godart*), Algeria (*Lucas* and *Lang*), India, North India, Canara (*Horsfield* and *Moore*) ; Bengal, Ceylon (*Moore*) ; West Africa, Aden, Mhow (*Butler*) ; North Sind, Sukkur, Shikarpore ; Poona, September, November, and January ; Bombay, October ; Mhow, September to July (*Swinhoe*) ; Haldwani, at the foot of the Kumaon Hills (*Doherty*).

EXPANSE : ♂, ♀, ·9 to 1·1 inches.

DESCRIPTION : MALE. UPPERSIDE, *both wings* shining bluish-purple, with a narrow outer dull black margin, the *cilia* whitish. *Forewing* with a somewhat large and long rounded or ovate black disco-cellular spot. *Hindwing* with a round black spot on the margin in the first median interspace, and a longitudinal one at the anal angle, the outer narrow black border inwardly defined at this part (sometimes throughout) with a fine white marginal thread ; *tail* black, tipped with white. UNDERSIDE, *both wings* greyish-white (sometimes with a faint ochreous tinge). *Forewing* with the following markings, all deep brown, sometimes of a more or less rusty tint, *viz* :—a lengthened longitudinal subcostal streak from the base of the wing, joining the costa at about one-third of the length of the wing and continued along it ; an oblique subbasal or ante-discal wedge-shaped streak with its apex on the subcostal extending to the submedian nervure, sometimes divided in the middle into two portions ; beyond this is a transverse discal striga from the first subcostal nervule to the submedian nervure, sometimes continuous though slightly dislocated, sometimes in two distinct portions, its lower portion shifted somewhat outwardly ; beyond this on the anterior portion of the disc are three large spots forming a triangle, the upper spot is sometimes round, sometimes lengthened, the middle spot is rounded, the lower spot lengthened and placed at right angles to the upper spot and sometimes coalescing with the lower portion of the discal striga ; beyond these spots is a regular series of spots sometimes well-separated, sometimes joined together into a band, its anterior portion curved towards the base of the wing before it reaches the costa ; a submarginal series of six rounded regular well-separated spots, and an anteciliary black line. *Hindwing* with a crescent-shaped black basal band from the costal nervure to the abdominal margin, sometimes divided into a long anterior portion and a well-separated spot on the abdominal margin ; a subbasal transverse series of four black spots crossing the wing, sometimes joined into a continuous straight band, sometimes arranged in a straight line, sometimes placed in echelon ; an irregular discal series of six spots arranged in pairs ; three spots beyond in the middle of the disc ; a regularly-curved band beyond, sometimes divided into eight well-separated spots ; a marginal series of seven round spots, the four lower ones being black and profusely sprinkled with metallic-greenish scales ; a fine anteciliary line. FEMALE. UPPERSIDE, *both wings* blackish, sprinkled with metallic bluish-purple scales towards the base. *Forewing* with all the black markings of the underside more or less showing through by transparency, some whitish spots on the disc. *Hindwing* with a discal series of short white streaks between the veins ; a marginal series of black spots between the veins inwardly defined by white lunules ; a fine white, then a fine black marginal thread. UNDERSIDE, *both wings* as in the male.

I have drawn up the above description from three male and a female specimen from Algeria in the collection of the Indian Museum, Calcutta, these specimens representing the typical form of the species. It will be noted that these four specimens differ a good deal *inter se*, a large series would probably present many more differences.

Mr. Moore describes the Ceylon form as follows :—" MALE. UPPERSIDE, *both wings* lavender-blue, costal edge and exterior margins narrowly lined with black. *Forewing* with an indistinct black disco-cellular spot. *Hindwing* with a less distinct subanal spot ; *tail* black, tipped with white. *Cilia* white, with inner black border. UNDERSIDE, *both wings* greyish-white. *Forewing* with a black straight streak below the costal nervure, an oblique subbasal streak, two transverse discal streaks, three subapical spots, and two marginal rows of quadrate spots. *Hindwing* with a transverse basal and subbasal black streak, irregularly disposed discal spots, a submarginal broken row of lunular spots, and a marginal row of slightly larger rounded

spots, the outer series speckled with metallic green scales. FEMALE. UPPERSIDE, *both wings* with blue basal and white discal areas, the discal areas black-spotted, the outer borders black and traversed by a more or less distinct row of slender white lunular marks which are single on the forewing and double and broadest on the hindwing." UNDERSIDE, *both wings* as in the male.

"*Note.*—The markings on the underside of this species are wider and more broken up than in the allied North Indian form (*T. nara*,* Kollar), and the female is more prominently white-marked on the upperside." (*Moore*, l. c. in Lep. Cey.)

Fabricius in establishing the species in 1793, described only the female: but Godart in the Encyclopédie in 1823 described also the male. Dr. Horsfield in 1828 redescribed both sexes: but the India House Museum contained only one female specimen from the Mediterranean coast, this species not having been taken in Java by Dr. Horsfield. The term used by him for the colour of the underside macular streaks is '*ater*': while he distinguishes the penultimate spot of the marginal series of the hindwing as '*niger*'—and '*pronounced black*.'

"M. Lucas' figure is not very characteristic. The species may readily be distinguished from *T. nara*,* Kollar, of India by the break in the submarginal series of spots on the underside of the hindwing, the spots towards the costa forming a line with those beyond the cell." (*Butler*, l. c. in Proc. Zool. Soc. Lond., 1884). I find this character to hold good in a single female specimen from Aden (Mr. Butler is writing about Aden butterflies) in my collection, but it does not exist in the four typical Algerian specimens I have described above. As I cannot find this character represented in any Indian specimen, and it does not occur (in some at any rate) North African examples, Mr. Butler may hereafter, perhaps, consider it a sufficient character on which to found a "new species."

EGG, pale apple-green with porcelain-white ridges and tubercles, the ridges arranged in lines parallel to or concentric with the equator, the tubercles arranged meridianally in curved lines, so that the tubercles, when the egg is viewed from above, form a figure like a star of many rays all curved similarly and in the same direction. The tubercles appear very conspicuous under a microscope and are blunt conical, in size they are equal in diameter about to the intervals between them. The egg is very much flattened, and with a wide depression at its apex, it has in fact much the proportions of an Echinoid of the genus *Diadema*. The character of the sculpturing of this egg, as compared with that of *Curetis thetys*, Drury, is quite different. LARVA, just half an inch in length when full-grown, much flattened, the head pale ochreous and completely hidden under the second segment, which is somewhat wide, the third and fourth segments progressively a little wider, whence the body very gradually tapers to the last segment, which is about as wide as the second. Colour pale green, the whole upper surface covered with a shagreening of small white tubercles, which under a magnifying glass give it a frosted appearance; along the lateral edge of the body and round the anal segment there are numerous somewhat long whitish hairs. From the third to the anal segment there is a somewhat broad (slightly decreasing in width pòsteriorly) yellowish-green dorsal stripe, which bears a red stripe in its middle decreasingly on the first four segments on which it appears; in some specimens the dorsal stripe is marked with reddish on both sides, which colour is very conspicuous on the twelfth and thirteenth segments. There is also a subdorsal series of small spots from the third to the eleventh segments inclusive, which are quite inconspicuous in some specimens. The extensile organs on the twelfth segment are small. The constrictions between the segments slight and inconspicuous. Dr. Lang says it feeds on "*Liziphus* [? *Zizyphus*] *vulgaris*." In India it eats the young leaves and flower buds of *Zizyphus jujuba*. Dr. A. Forel of Geneva identifies the ants which attend these larvæ as "*Camponotus rubripes*, Drury (*sylvaticus*, Fabricius), subspecies *compressus*, Fabricius; and *Pheidole latinoda*, Roger." PUPA, of the usual lycænid shape; head, thorax, and wing-cases green speckled thickly with black, abdomen green. There is an indistinct

* How either Mr. Moore or Mr Butler can have ascertained that the underside spots and markings of Kollar's *T. nara* were wide or narrow, continuous or macular, I am at a loss to understand, seeing that Kollar's Latin and German descriptions give absolutely no information whatever on these points.

blackish dorsal line extending down the whole length of the body, with a double subdorsal series of indistinct black specks ; the head is rounded, the thorax slightly humped, the pupa throughout quite smooth.

Mrs. Wylly has sent me a very interesting note on the behaviour of the "large common black ants of Indian gardens and houses" to the larva of *T. theophrastus*. In this account, after describing the special organs possessed by these larvæ, she relates the way the ants attend the caterpillars till they are full-grown, when the ants drive them down the stem of the tree which they have hitherto inhabited into a temporary nest the ants have set up at the foot of the tree, where on opening the nest "you will see some hundreds of larvæ and pupæ in all stages of development arranged in a broad and even band all round the trunk, and lightly covered with earth." The perfect insects emerge in this nest, and after drying their wings are allowed to fly away unmolested.

I have only to add that it seems highly improbable to me that a species which is obviously so variable, and whose variations are not confined to well-defined regions, can be split up into numerous distinct species as Mr. Butler evidently thinks it can. The full number of these so-called new species has not apparently been reached, as Mr. Butler says that Colonel Swinhoe's specimens "represent two or more new species," of which he describes one.* The certain proof of the identity of several forms in one species is, however, to be found only in breeding the species from the egg at all seasons of the year throughout the country ; and entomologists who would make a serious attempt to solve this question should experiment in this direction, and, as the species is wide-spread and its food plant (*Zizyphus*) is also easily accessible, they should have no difficulty in doing so.

753. **Tarucus nara,** Kollar.

Lycæna nara, Kollar, Hügel's Kaschmir, vol. iv, pt. 2, p. 421, n. 6 (1848) ; *Tarucus nara*, Butler, Proc. Zool. Soc. Lond., 1881, p. 606, n. 20 ; idem, id., 1886, p. 366, n. 42 ; idem, id., Ann. and Mag. of Nat. Hist., sixth series, vol. i, p. 147, n. 47 (1888) ; id., Moore, Proc. Zool. Soc. Lond., 1882, p. 245; id., Swinhoe, l. c., 1884, p. 506, n. 22 ; idem, id., 1885, p. 134, n. 70 ; idem, id., 1886, p. 427, n. 54.

HABITAT : Masuri (*Kollar*) ; Campbellpore, Punjab ; Karachi, May and October (*Butler*) ; N.-W. Himalayas (*Moore*) ; Karachi, appears in great plenty at latter end of April and lasts until about the middle of August ; Poona, October, December, January, April, and May ; Bombay, July to December ; Ahmednuggur, August and September ; Mhow, September to July (*Swinhoe*).

EXPANSE : ♂, ♀, ·95 of an inch (*Kollar*).

DESCRIPTION : "MALE. UPPERSIDE, *both wings* shining with violet, with a median black dot. UNDERSIDE, *both wings* white spotted with black. *Hindwing* with marginal dots sprinkled with greenish-golden. FEMALE. UPPERSIDE, *both wings* somewhat fuscous spotted with white, powdered with bluish." UNDERSIDE, *both wings* as in the male.

"Nearly allied to *Lycæna* [*Castalius*] *rosimon*, Fabricius, especially on the underside. On the UPPERSIDE (of the male), violet-blue with a longish black spot in the middle of each forewing, and a narrow border of the same colour on both wings. On the UNDERSIDE of the wings white : the *forewing* with a black streak ascending obliquely from the base towards the costal margin : but all the wings with several black spots which are grouped in a band-like manner. Four (and sometimes five) of these spots in the outermost row on the hindwing are thickly beset with golden green scales. The female differs from the male in being of a dirty brown colour on the upperside of the wings on which the white colour of the underside shows through in a spotty manner, and a few blue scales are visible at the base of the wings. Whether the hindwing was furnished with a slender tail cannot be found out, as the two specimens which we possess are somewhat damaged. The abdomen is brown on the back and alternately white and brown on the sides : but beneath it is white. The antennæ brown with white rings." (*Kollar*, l.c.)

It will be observed that Kollar's descriptions (taken from only two injured specimens brought by Baron Von Hügel from Masuri) are not sufficiently precise to enable any one who has never seen

* Proc. Zool. Soc. Lond., 1886, p. 366, n 42.

these two types to institute any comparisons, in respect to the size and distribution of the spots, between Kollar's *nara* and other forms of the variable *theophrastus*. The description, such as it is, suits *theophrastus* generally, and all that can be really decided is that the types represented a *theophrastus* (?) of 11½ lines in expanse, and of a decidedly white undersurface with black spots. The terms used by Kollar, who is precise in definition, both in his Latin and German descriptions, for the colours of the underside, are distinctly black and white, not blackish, or fuscous or brown or whitish: so far he is precise: but the size and the exact arrangement of these spots is not in the slightest degree indicated, beyond the fact that they were arranged 'band fashion.' The basal streak, however, on the forewing, so characteristic of *T. theophrastus*, is clearly described, as are also the four or five golden green bespecked spots on the exterior margin of the hindwing below; so that we may safely assume that *T. theophrastus* or a form of that species is here described; but that is all. But when writers of the present day proceed to compare the size and arrangement of the spots of their newly-named species with those of Kollar's *T. nara*, they must evolve from their inner consciousness alone some imaginary *T. nara* with which to effect the comparison.

In the Indian Museum, Calcutta, are three males, two from Kalka in the Punjab and one from Bholahât in the Malda district, which have been named *T. nara* by Mr. Moore. But these specimens agree (in the arrangement though not in colour of the spots below) exactly with Mr. Butler's description of *T. callinara*, and I do not know the basis of Mr. Moore's identifications of these particular specimens with the very meagrely described *T. nara* of Kollar; in fact, it may be certainly affirmed that to whatever form of *T. theophrastus* these three specimens pertain it is *not* to the black-spotted *T. nara*, as their spots below are all ferruginous-brown. The fact is there is nothing to distinguish *T. nara* as described by Kollar from *T. theophrastus* as described by Horsfield.

Colonel A. M. Lang, R. E., reports that in Kumaon he has found this species very uncommon; but at 5,500 feet altitude near Naini Tal he has taken in June specimens clear white below with the markings black or nearly so, and thus coinciding with the description, as far as it goes, of Kollar's N.-W. Himalayan insect *T. nara*.

754. **Tarucus callinara,** Butler.

T. callinara, Butler, Ann. and Mag. of Nat. Hist., fifth series, vol. xviii, p. 185, n. 24 (1886); idem, id., l. c., sixth series, vol. i, p. 147, n. 46 (1888).

HABITAT: Sheemagar, Upper Burma, December; Hurripur, N.-W. India, 13th October, 1886; various parts of India (*Butler*).

EXPANSE: ·95 of an inch.

DESCRIPTION: "Near to *T. nara*, Kollar, with which both sexes agree on the upperside; on the underside, however, they agree with *T. venosus*, Moore, the black markings being all much enlarged; the submarginal lunules separate, instead of in a continuous dentate-sinuate line; the series of spots beyond the cell of the hindwing quite distinctly arranged, commencing with three spots in a regular oblique series, the third of these forming the first of three spots arranged in a triangle, and beyond these two spots placed angle to angle, the lower one contiguous with the subbasal series."

"The preceding appears to be a widely-distributed species, occurring in various parts of India and flying in May, July, August, September, and December. We have received it in all Colonel Swinhoe's collections under the name of *T. theophrastus*, Fabricius, an African species, differing considerably from it in the arrangement of the markings on the underside of the hindwing." (*Butler*, l. c.)

The arrangement of the spots on the underside of the hindwing agrees exactly with that of some specimens which have been named for the Indian Museum, Calcutta, by Mr. Moore, as *T. nara*, Kollar, but which (as I have above shown) cannot be referred to that particular form of *T. theophrastus*. In *T. venosus*, Moore, also, the submarginal lunules on the underside of both wings are often separated into distinct spots, and I know of no single character by which *T. callinara* can be distinguished. It is said to have its underside markings different from

those of Kollar's *nara* in certain particulars; but as Kollar never described the arrangement of the markings of his species, there is no basis whatever on which to found a comparison and to note the deviations, as Mr. Butler has attempted to do.

This form, however it may be defined, falls under the general description of *T. theophrastus*, given above. It has no pretentions to be a geographical variety, as it occurs in localities so far apart and so diverse in physical aspects as Burma and N.-W. India; and it is stated by Mr. Butler to have a wide distribution in many parts of India.

755. **Tarucus alteratus,** Moore.

T. alteratus, Moore, Proc. Zool. Soc. Lond., 1882, p. 245, pl. xii, figs. 4, 4*a*, *male*.

HABITAT: Dharmsala, N.-W. Himalayas.

EXPANSE: ·83 of an inch.

DESCRIPTION: "Allied to *T. nara*, Kollar, but smaller. UPPERSIDE, *both wings*, colour paler, and of a more decided blue tint than in *T. nara*. *Forewing* with a slender disco-cellular dusky lunule. *Hindwing* with a small dusky spot above the tail, and a slender marginal white line. UNDERSIDE, *both wings* dull pale greyish-ochreous, with similarly disposed markings as in *T. nara*, which are, however, more slender, paler, and much less distinct, those on the *hindwing* being reddish-ochreous, the marginal metallic spots more or less golden. *Cilia* brownish-white." (*Moore*, l. c.)

The distinguishing feature of this species is the ochreous colour of the ground on the underside, and the attenuated markings of a reddish colour. From the description, some specimens of *T. extricatus*, Butler, have the markings on the underside much the same colour (rust-red), but that species is said to have the markings below as in *T. theophrastus*, Fabricius, while *T. alteratus* has them as in *T. nara*. But as explained above, no one can state in the slightest degree what was the arrangement of the markings of Kollar's *T. nara*. Of all forms of *T. theophrastus* this is the furthest removed from *T. nara*, which, whatever other characters it may have had, was an insect with a white underside and black markings: this form has a pale ochreous-grey underside with very slender and pale reddish-ochreous markings. It is in fact the best-marked form of *T. theophrastus* which has yet received a name, and is the most likely of them to be established as a separate species, should this be the case with any of these forms.

Colonel Lang reports that is a common form in the Punjab in the winter, affecting arid ground and especially avenues or plantations of *Acacia arabica*, on which he used to think the larva fed: he never however found the larva. It may be the dry-season form in those localities of some darker-coloured wet-season form of *T. theophrastus*. I possess typical specimens from Kattiwar, Kulu, and from Bholahât in the Malda district.

756. **Tarucus extricatus,** Butler.

T. extricatus, Butler, Proc. Zool. Soc. Lond., 1886, p. 366, n. 43, pl. xxxv, fig. 2, *male*; idem, id., Ann. and Mag. of Nat. Hist., sixth series, vol. i, p. 147, n. 45 (1888).

HABITAT: Karachi, Campbellpore, Landour.

EXPANSE: ♂, ·6 to 1·0; ♀, 1·1 to 1·2 inches.

DESCRIPTION: "Paler than *T. nara*, Kollar, on the UPPERSIDE; varying in size even more than *T. balkanica*, Freyer. UNDERSIDE readily distinguished by the much greater regularity of the markings, those of the *forewing* being arranged nearly as in *T. theophrastus*, Fabricius (*i. e.*, the medial stripe [on the *forewing*] is often unbroken, the subcostal spot beyond sometimes confluent with it so as to form a Γ-shaped marking; the dashes beyond the medial stripe placed transversely and always confluent instead of forming an interrupted <-shaped character); the markings of the *hindwing* vary in colour from rust-red to black, but correspond in character with those of *T. nara*." (*Butler*, l. c.)

"Taken in Karachi in May, October, and December, 1885, and in January and April, 1886." (*Swinhoe*).

T. extricatus, as above defined, appears to be an insect varying from ·6″ to 1·2″ in expanse: of a pale violet tint, having the medial striga of the forewing below *often* unbroken (as this

however is admittedly not constant, the character is of no value) : the subcostal spot *sometimes* [only] confluent with it (again an inconstant, valueless character) : the dashes beyond the medial striga confluent (but this is the case in very many specimens of *T. theophrastus*) : the hindwing markings varying from rust-red to black (thus no character is established in respect to this particular) : they correspond in character with those of Kollar's *T. nara*, (which are entirely unknown). If the above be critically considered, it will be found that not one single character remains by which to distinguish *T. extricatus*. The colourless, characterless, description will suit *T. theophrastus* in any of its forms. In the 'rust-red' markings of some specimens of the form there is agreement with *T. alteratus* : but that form has a deeper blue upper surface in the male, while this form is of a pale violet tint, which, however, it shares with many ordinary *T. theophrastus*.

In the above description Mr. Butler defines the supposed differences between *T. extricatus* and his conception of Kollar's *T. nara*, but he gives little indication how the former is supposed to differ from *T. theophrastus*. The specimen Mr. Butler figured must be abnormally small, as he speaks afterwards of obtaining another male specimen from Campbellpore "about twice the size of my type, or about as large as the smaller examples of *T. nara*."

757. **Tarucus venosus**, Moore. (PLATE XXVII, FIG. 189 ♂).

T. venosus, Moore, Proc. Zool. Soc. Lond., 1882, p. 245, pl. xii, figs. 6, 6*a*, *male*; id., Doherty, Journ. A. S.B., vol. lv, pt. 2, p. 132, n. 160 (1886) ; id., Butler, Ann. and Mag. of Nat. Hist., sixth series, vol. i, p. 147, n. 48 (1888).

HABITAT: Dharmsala; Kulu Valley; Kala Pani, N.-W. India, 30th August, 1886; Bagheswar, Sarju Valley, common, also in the Kali Valley, 2-4,000 feet, Kumaon; Malda district.

EXPANSE: ♂, ♀, 1·0 to 1·3 inches.

DESCRIPTION: "Allied to *T. theophrastus*, Fabricius, and to *T. nara*, Kollar. Wings larger and broader, forewing less triangular, the exterior margin more convex. UPPERSIDE, *both wings* duller blue than in *T. theophrastus* and *T. nara*, and of a slight violaceous tinge, with a broad marginal dusky border, similar to that in the male [? female] of *Zizera chandala* [= *Z. maha*, Kollar], veins dark-lined. *Forewing* with a broad dusky spot [in the cell]. *Hindwing* with a slender lunule at the end of the cell, and a slender white marginal line above the tail. UNDERSIDE similar to the above-quoted species, all the markings, however, being broader in both sexes. FEMALE. UPPERSIDE, *both wings* entirely violet-brown, with the exception of a very few blue scales sparsely disposed on the basal area. *Forewing* with an indistinct darker cell-spot. *Hindwing* with a spot above the tail. UNDERSIDE as in the male. *Cilia* whitish." (*Moore*, l. c.)

I believe *T. venosus* to be a distinct species, though breeding may prove it to be a dark form of *T. theophrastus* only, occurring in the rains. It is the largest species of the genus, has a very broad outer black margin on the upperside of both wings, the markings below large and prominent. The number of the black spots on the upperside of the forewing in the male varies considerably, five being the common number. I took a considerable series of it in the Kulu Valley, in July, the specimens hovering round and settling on a *Zizyphus* bush, on which the larva doubtless feeds. Mr. A. Grahame Young has also taken it in Kulu in August. As typical *T. nara* and *T. alteratus* occur also in the same spot, it is by no means improbable that they are all one species, *T. alteratus* being the spring broad, *T. venosus* the rains' brood, and *T. nara* appearing just before or just after the rains. Major J. W. Yerbury reports that *T. venosus* occurs commonly at Campbellpore almost all the year round, also that he gets it commonly on the lower slopes at Murree and Thundiani in August and September. The former statement requires verification ; it is most desirable that accurate observations should be made as to the exact times of appearance of this species. My own belief is that it occurs only in the rains. Mr. W. H. Irvine has sent me a single male taken at Bholahât in the Malda district, which I am unable to separate from this species.

The figure shows both sides of a male specimen from Kulu in the Indian Museum, Calcutta.

758. **Tarucus plinius**, Fabricius.

Hesperia plinius, Fabricius, Ent. Syst., vol. iii, pt. 1, p. 284, n. 92 (1793); *Papilio plinius*, Donovan, Ins. Ind., pl. xlv, fig. 1 (1800); *Polyommatus plinius*, Godart, Enc. Méth., vol. ix, p. 658, n. 140 (1823); *Lycæna plinius*, Horsfield, Cat. Lep. E. I. C., p. 72, n. 7 (1828); *Tarucus plinius*, Moore, Lep. Cey., vol. i, p. 82, pl. xxxvi, fig. 4 (1881); id., Swinhoe, Proc. Zool. Soc. Lond., 1884, p. 506, n. 23; idem, id., l. c., 1885, p. 133, n. 69; idem, id., l. c., 1886, p. 427, n. 53; *Lampides cassius*, Cramer, var. *plinius*, Butler, Cat. Fab. Lep. B. M., p. 164, n. 6 (1869); ——? *plinius*, Doherty, Journ. A. S. B., vol. lv, pt. 2, p. 132, n. 161 (1886); *Lycæna pulchra*, Murray, Trans. Ent. Soc. Lond., 1874, p. 524, pl. x, figs. 7, *male*; 8, *female*; *Tarucus pulcher*, Butler, Proc. Zool. Soc. Lond., 1884, p. 483, n. 12.

HABITAT: West Africa (*Murray*), Aden (*Butler*), Karachi, N.-W. Himalayas, Kumaon, almost everywhere in the plains of India, Ceylon, Upper Burma, Java, Formosa.

EXPANSE: ♂, ♀, 1·0 to 1·2 inches.

DESCRIPTION: "MALE. UPPERSIDE, *both wings* pale violet-blue, with a purple reflexion, surrounded by a very delicate brown border fringed with white. UNDERSIDE, *both wings* white and variegated with oblique transverse or semi-transverse bands irregularly sinuated at their edges, oblong or tapering, of unequal breadth, and arranged in the following succession:—*Forewing*, at the base a broad longitudinal band extends with a slight obliquity to the middle of the costa; between this and the interior margin is a triangular mark; and before [beyond] this a transverse mark gradually attenuated towards the costa; an obscure evanescent band next extends from the exterior margin to the disc; and immediately exterior to this, a prominent band gradually increasing in breadth and terminated by a short point, passes over the disc; the band next in order is short, and near its termination a nearly circular or oblong spot is placed; two obliquely transverse bands now extend from the costa half across the wing, the first being oblong, the other attenuated or pyramidal; the posterior margin is bounded by two regularly-continued strigæ, the anterior of which is broader and slightly waving, enclosing a series of oblong marks. *Hindwing* with these latter continued uniformly to the anal region, where the two last are of a deep black tint, with a yellowish iris, and covered with greenish resplendent irrorations; to the last a very minute black spot at the extreme anal angle is applied; the marginal spot in the anterior apical angle is more pronounced than the rest; the disc and base are variegated with very irregular oblong marks, with sinuated margins, transversely arranged, the posterior one being most conspicuous and decorated with acute radiant points directed to the margin. *Tail* very slender and grayish at the base [tip]. *Antennæ* and *abdomen* banded. FEMALE. UPPERSIDE, *both wings* greatly resembles *Lycæna* [*Castalius*] *rosimon*, Fabricius; the surfaces covered with transverse patches, and the blue tint, which is purely azure, is confined to the base. UNDERSIDE, *both wings* agree with the male in the disposition of the marks, but the surface is whiter, the bands are more intensely coloured, and their edges are more regularly defined. The radiated band in the *hindwing* is less distinct than in the male, but the marks generally are more pronounced." (*Horsfield*, l. c.)

"The structure of the costal and subcostal nervures of the forewing shows that this species does not belong to Mr. Moore's genus *Tarucus*." (*Doherty*, l. c.)

"*T. plinius* is not so common as *T. theophrastus*, Fabricius, but not rare, coming out at the same season. I have found the larva on *Sesbania aculeata*, an annual which springs up everywhere in Bombay during the rains, and shoots up to a height of six or seven feet and withers away in October. Its fragile leaves wither up a few minutes after being plucked, and it is no easy matter to rear a minute larva on them. I was successful with only one. I find it described in my notes as green and of the usual wood-louse form, with a dorsal ridge of small protuberances. The pupa, [from] which [the butterfly] came out in seven days, was greenish, smooth, not a quarter of an inch long, and closely attached to the bottom of the pill-box in which it was kept." (*Aitken*, Journ. Bombay Nat. Hist. Soc., vol. i, p. 217, n. 57 (1886).

I possess a note from an unknown correspondent that the larva of *T. plinius* feeds on plumbago. Colonel Lang also writes: "Almora, 5,500 feet, local. Numerous about hedges of *Plumbago capensis*."

Mr. E. E. Green has sent me drawings of the transformations of this species, and writes: "Egg flattish, apex concave. Larva pale greenish-yellow above, sides lilacine, a narrow brownish median line followed by eight diagonal short streaks and six brownish-red spots. Before pupating the colouring becomes much more diffused. Feeds amongst the flower buds of Plumbago. Pupa dull yellowish, profusely mottled with brown spots. I have never observed ants attending this larva."

T. plinius is a common and wide-spread species, occurring in Western Africa, at Aden, throughout India, Ceylon and Burma, but not in the Malay Peninsula, reappearing however in Java and Formosa. It is extremely pugnacious, fighting with others of its own species whenever it meets them, and ascending high into the air during the contest. It settles chiefly on bushes or trees, seldom on the ground. Having seen specimens of "*Lycæna*" *pulchra*, Murray, from Aden, in Colonel Swinhoe's collection identified by Mr. Butler, I have no hesitation in sinking that species as a synonym of *T. plinius*, with which, moreover, the description and figures entirely agree.

Genus 123.—CASTALIUS, Hübner. (FRONTISPIECE).

Castalius, Hübner, Verz. bek. Schmett., p. 70 (1816); id., Moore, Lep. Cey., vol. i, p. 82 (1881); id., Distant, Rhop. Malay., p. 214 (1884).

"FOREWING, triangular; *costa* arched at the base, *apex* pointed, *exterior margin* oblique and slightly convex; *costal nervure* extending to a little over half length of the margin; *first subcostal nervule* very short, anastomosed to the costal nervure for a short distance near its end, emitted at nearly one-half before the end of the discoidal cell; *second* subcostal at a very short distance before [beyond] the base of the first; *third* subcostal at one-eighth before the end of the cell; *fourth* subcostal at one-half beyond the cell; *fifth* subcostal [upper discoidal] from the end of the cell; *disco-cellular* nervules slightly oblique and recurved, *radial* [lower discoidal] nervule from their middle; *discoidal cell* extending to more than half length of the wing; *second median* nervule emitted at one-eighth before the end of the cell, *first median* at one-half before its end; *submedian nervure* nearly straight. HINDWING, bluntly oval; *exterior margin* convex anteriorly, slightly angled, and with a delicate *tail* at the end of the first median nervule; *costal nervure* arched at the base and extending to the apex; *first subcostal nervule* emitted at one-fourth before the end of the cell; *disco-cellular* nervules recurved, *radial* [discoidal] nervule from their middle; *discoidal cell* short, broad; *third* and *second median nervules* from the end of the cell, *first* median at one-third before its end; *submedian nervure* straight, *internal* nervure recurved. BODY small, *abdomen* short; *palpi* porrect, long, second joint compressed, clothed with compact hair-scales, projecting half its length beyond the head, third joint slender, naked, more than half the length of the second; *legs* slender; *antennæ* with a blunt spatular club. Type, *C. rosimon*, Fabricius." (*Moore*, l. c.)

On examination of the neuration of a bleached male and female of the type species taken in Calcutta, I find that in the forewing the costal nervure terminates on the margin about opposite to the end of the cell; the first subcostal nervule in the male for a short distance lies close to but is distinctly separated from the costal nervure, but in the female that it lies alongside of and touches, but is not anastomosed with, that vein; the base of the second subcostal is much nearer to that of the first than to that of the upper discoidal; the third subcostal is rather short, and is emitted nearer to the apex of the wing than of the cell; the disco-cellular nervules are nearly upright, slightly convex, the lower rather longer than the middle. In the hindwing the disco-cellulars are nearly in one straight line and upright, the second median nervule originating just before the lower end of the cell. The female differs from the male in having the wings rather broader, the apex of the forewing less acute, the outer margin more convex. The eyes are hairy.

There is more diversity in the coloration and markings in the species of this genus than is usual amongst *Lycænidæ* of this group, but all are well-distinguished by a white or pale yellow underside heavily marked with large black spots and blotches. On the upperside *C. rosimon* in both sexes has some metallic blue at the base of the wings only; this is characteristic also of the female of *C. ananda*, of which species, however, the male is deep shining purple on the upperside, in this respect being unique in the genus. *C. ethion* and *C. airavati* have the male brilliant metallic pale blue on the upperside with a white discal band to both sexes, the females lacking the blue coloration altogether. All the other species are without blue in either sex, but are easily distinguished by the disposition and shape of the black markings on the underside. Most of the species are common where they occur, and many of them have a wide range. Their flight is rapid, but never sustained for long distances. They almost always settle on the ground or on low plants, seldom or never on high bushes or trees. The males of *C. elna* and *C. decidia* in Sikkim are very common on damp spots by the sides of streams sucking up the moisture. In three species, *C. rosimon*, *C. elna*, and *C. decidia*, seasonal dimorphism occurs to a very great extent; this takes the usual form of melanism in the rains and albinism in the dry-season. In Ceylon, where the seasons are more equable, the extreme dry-season form of *C. decidia* (*interruptus*) does not occur, though the intermediate form (*hamatus*) is met with. As regards the distribution of the genus, it occurs in Africa, throughout India, Ceylon, the Andaman and Nicobar Isles, Burma, and the Malay Peninsula and Archipelago. As the genus is used by but few authors, I am unable to give its exact distribution, or to indicate how many species are known to occur in it. The transformations of no species of the genus are known, as far as I am aware.

Key to the Indian species of Castalius.

A. Both sexes, upperside, both wings, ground-colour white, marked with large black spots and an outer black margin; base of the wings metallic blue.

759. C. ROSIMON, India, Ceylon, Andamans and Nicobars, Burma, Malay Peninsula, Siam, Malay Archipelago.

B. Male, upperside, both wings, ground-colour deep shining purple, with narrow outer black margins. Female, upperside, ground-colour blackish, base of wings metallic blue.

760. C. ANANDA, Sikkim, Assam, Orissa, South India.

C. Both sexes, upperside, both wings, ground-colour black, with a discal white band.

- *a*. Male, upperside, both wings with the base and disc glossed with metallic light blue. Female entirely black. Both sexes with two subbasal parallel black bands an underside of forewing.
  - *a*¹. Both sexes, upperside, both wings with discal white band wide; underside, both wings, markings small, hindwing with discal spots well-separated.

    761. C. ETHION, South India, Ceylon, Andamans, Assam, Burma, Malay Peninsula, Siam, Malay Archipelago.
  - *b*¹. Both sexes, upperside, both wings with discal white band narrow; underside, both wings, markings large, hindwing with discal spots connected, forming a band.

    762. C. AIRAVATI, Great Nicobar Island.
- *b*. Male, upperside, both wings unglossed with blue.
  - *a*¹. Underside, forewing, with a single straight subbasal black band.
    - *a*². Underside, hindwing, base of costa white.

      763. C. ROXUS, Andamans, Burma, Malay Peninsula and Archipelago.
    - *b*². Underside, hindwing, base of costa black, black markings much broader than in *C. roxus*, discal white band on upperside narrower.

      764. C. MANLUENA, Nicobar Isles.
  - *b*¹. Underside, forewing, with a single elbowed subbasal black band.

    765. C. ELNA, Sikkim, Bhutan, Assam, Burma, Malay Peninsula, Java, Orissa, Andamans.
  - *c*¹. Underside, forewing, with a single elbowed subbasal black band as in *C. elna*, but in addition a basal longitudinal clavate black streak.

    766. C. DECIDIA, Bombay, Malda, Sikkim, Assam, Orissa, Ganjam, Nilgiris, Ceylon.

759. **Castalius rosimon**, Fabricius.

Papilio rosimon, Fabricius, Syst. Ent., p. 523, n. 341 (1775) ; idem, id., Sp. Ins., vol. ii, p. 121, n. 541 (1781) ; idem, id., Mant. Ins., vol. ii, p. 71, n. 672 (1787) ; id., Herbst, Pap., pl. cclxxxix, figs. 5—7 (1800) ; *Hesperia rosimon*, Fabricius, Ent. Syst., vol. iii, pt. 1, p. 288, n. 104 (1793) ; *Polyommatus rosimon*, Godart, Enc. Méth., vol. ix, p. 658, n. 141 (1823) ; *Lycæna rosimon*, Horsfield, Cat. Lep. E. I. C., p. 71, n. 6 (1828) ; id., Snellen, Tijd. voor Ent., vol. xix, p. 152, n. 41 (1876) ; *Cupido rosimon*, Druce, Proc. Zool. Soc. Lond., 1874, p. 106, n. 1 ; id., Snellen, Tijd. voor Ent., vol. xxi, p. 17, n. 79 (1878) ; *Lampides rosimon*, Wood-Mason and de Nicéville, Journ. A. S. B., vol. l, pt. 2, p. 235, n. 41 (1881) ; *Castalius rosimon*, Hübner, Verz. bek. Schmett., p. 70, n. 697 (1816) ; id., Butler, Cat. Fab. Lep. B. M., p. 162, n, 1 (1869) ; id., Moore, Lep. Cey., vol. i, p. 83, pl. xxxvi, fig. 2 (1881) ; id., Distant, Rhop. Malay., p. 215, n. 1, pl. xxii, fig. 20, *female* (1884) ; *Papilio maimon*, Fabricius, Syst. Ent., p. 534, n. 395 (1775) ; idem, id., Sp. Ins., vol. ii, p. 137, n. 635 (1781) ; idem, id., Mant. Ins., vol. ii, p. 90, n. 817 (1787) ; *Hesperia maimon*, id., Ent. Syst., vol. iii, pt. 1, p. 349, n. 327 (1793) ; *Papilio clyton*, Cramer, Pap. Ex., vol. i, pl. lxvii, figs. F, G (1775) ; *Castalius clyton*, Hübner, Verz. bek. Schmett., p. 70, n. 695 (1816) ; *Polyommatus clyton*, Godart, Enc. Méth., vol, ix, p. 679, n. 193 (1823) ; *Papilio coridon*, Cramer, Pap. Ex., vol. iv, pl. cccxl, figs. C—E (1781) ; *Castalius naxus*, Hübner, Verz. bek. Schmett., p. 70, n. 696 (1816); *Castalius chota*, Swinhoe, Proc. Zool. Soc. Lond., 1885, p. 133, n. 68 ; *C. approximatus*, Butler, Ann. and Mag. of Nat. Hist., fifth series, vol. xviii, p. 186, n. 27 (1886).

HABITAT : Throughout India, except the desert tracts ; the lower Himalayas, Ceylon, the Andaman and Nicobar Isles, Assam, Burma, Malay Peninsula, Siam, Java, Celebes, Timor.

EXPANSE : ♂, ♀, ·9 to 1·4 inches.

DESCRIPTION : " MALE. UPPERSIDE, *both wings* white, with a grayish-blue base, over which a brilliant silvery irroration, varying according to the light, is thinly spread ; anterior margin of both wings blackish-brown, a border of the same colour passing along the posterior margins, broader on the hindwing, indented at the inner edge, and bearing a regular series of white rings formed by crescents applied to each other, the exterior being in many cases so obscure, that merely a series of lunules directed outwards is apparent : a very irregular series of square or oblong maculæ passes along the inner edge of the marginal border, and several maculæ, more elongated, are scattered over the disc and along the anterior margin of both wings. UNDERSIDE, *both wings* white. *Forewing*, an oblique band of black extends from the base to the anterior margin, the interrupted macular fascia and the transverse marks of the disc and anterior margins appear more prominently on the underside ; and parallel with the posterior margin extend three rows of small oblong spots, of which three, in the posterior series near the anal angle of the hindwing, are covered with a bluish-silvery irroration. *Head*, *body*, and *abdomen*, black above and white underneath, the latter banded at the sides ; *antennæ* with white annuli. FEMALE, larger than the male. UPPERSIDE, *both wings* with the posterior border broader, the black colour more intense." UNDERSIDE, *both wings* as in the male. (*Horsfield*, l. c.)

C. rosimon, like many other butterflies of this family, is subject to considerable seasonal dimorphism, specimens which are on the wing during the rains being much darker and more heavily marked than those occurring in the dry-season. Two of these dry-season forms have lately been described as distinct species as below.* It is probable that all localities which have two strongly-marked seasons, a wet and a dry, produce specimens to match these descriptions.

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* *Castalius chota*, Swinhoe, Proc. Zool. Soc. Lond., 1885, p. 133, n. 68. HABITAT : Poona, February, May. EXPANSE : ·7 to ·9 of an inch. DESCRIPTION : " Smaller than typical *C. rosimon*, Fabricius. MALE and FEMALE. UPPERSIDE, *both wings* with the marginal bands narrow, and the discal spots smaller. UNDERSIDE, *both wings* with the spots also much smaller." (*Swinhoe*, l. c.)

Castalius approximatus, Butler, Ann. and Mag. of Nat. Hist., fifth series, vol. xviii, p. 186, n. 27 (1886). HABITAT : Katha on the Irrawaddy, Upper Burma, January ; Bombay. EXPANSE : 1·25 to 1·30 inches. DESCRIPTION : " Nearest to *C. chota*, Swinhoe, but running larger ; it differs chiefly from *C. rosimon*, Fabricius, in the narrower borders to the wings and in the absence of the last of the discal black spots towards the external angle of the forewing, the other five spots being well-separated ; also in the absence of the black spot close to the border of the hindwing towards the apex, and in the indistinct and minute character of the marginal spots on the underside."

" We have a pair of this form taken in Bombay by Colonel Swinhoe. Whether it is a species or only a well marked variety nobody can definitely decide without breeding it ; at any rate it is as distinct as the other named forms of the group." (*Butler*, l. c.)

C. rosimon has a wide range, being found on the lower outer Himalayas throughout their length, and everywhere in British India except the desert regions of Sind. It occurs in Ceylon, in the Andaman Isles, on Kamorta and Nankowri in the Nicobar group, and from Assam to the Malay Peninsula and Siam, also in many islands of the Malay Archipelago. *C. rosimon* has a near ally in the "*Lycæna*" *hintza* of Trimen, which is confined to South Africa. The male of this species is entirely blue on the upperside, being thereby at once distinguishable from *C. rosimon.*

760. **Castalius ananda,** de N.

C. ananda, de Nicéville, Journ. A. S. B., vol. lii, pt. 2, p. 75, n. 14, pl. 1, figs. 11, *male*; 11*a*, *female* (1883).

HABITAT: Sikkim; Khasi Hills; Orissa; Nilgiris; Kadur District, Mysore.

EXPANSE: ♂, ·85 to 1·15; ♀, ·85 to 1·05 inches.

DESCRIPTION: "MALE. UPPERSIDE, *both wings* deep shining purple, the outer margins black, and in some specimens with all the black markings of the underside showing through by transparency. UNDERSIDE, *forewing* sullied white, with the following black markings:—a broad basal streak, a transverse streak from the middle of the costa to near the middle of the wing, almost joined to another wider streak placed within it from the subcostal to the submedian nervure; a very irregular discal series of four or five oblong spots; an even submarginal series of seven spots, and a similar but smaller series on the margin divided from the cilia by a very fine black line. *Hindwing* with numerous spots scattered irregularly over the whole surface, and with the submarginal and marginal series as in the forewing; the spot, however, at the base of the tail, and the two confluent ones within it irrorated with metallic greenish scales. *Cilia* dusky throughout. *Tail* long, black with a white tip. FEMALE. UPPERSIDE, *both wings* pale dusky fuliginous, the markings of the underside showing through even more prominently than in the male, and the base thickly irrorated with metallic blue scales. UNDERSIDE, *both wings* as in the male." (*de Nicéville*, l. c.)

"I have taken only twelve males and one female on the northern slopes of the Nilgiris, confined to a quarter of an acre of ground, and evidently belonging to one brood. I found it common at the foot of the Nellyampathy Hills in Cochin in November, 1882." (*G. F. Hampson*).

Occurs in Sikkim in March, October, November and December.

761. **Castalius ethion,** Doubleday and Hewitson.

Lycæna ethion, Doubleday and Hewitson, Gen. Diurn. Lep., vol. ii, p. 490, n. 37, pl. lxxvi, fig. 3, *male* (1852); id., Hewitson, Ex. Butt., vol. v, *Lycæna* pl. i, fig. 5, *male* (1876); id., Snellen, Tijd. voor Ent., vol. xix, p. 152, n. 42 (1876); *Cupido ethion*, Druce, Proc. Zool. Soc. Lond., 1874, p. 106, n. 2; *Castalius ethion*, Moore, Proc. Zool. Soc. Lond., 1877, p. 587; idem, id., Lep. Cey., vol. i, p. 83, pl. xxxvi, figs. 5, 5*a*, *male* (1881); id., Butler, Trans. Linn. Soc. Lond., Zoology, second series, vol. i, p. 547, n. 2 (1877); id., Wood-Mason and de Nicéville, Journ. A. S. B., vol. l, pt. 2, p. 248, n. 49 (1881); id., Distant, Rhop. Malay., p. 216, n. 2, pl. xxii, fig. 25, *male* (1884).

HABITAT: Nilgiris, Travancore, Ceylon, Andaman Isles, Naga Hills, Sylhet, Burma, Malay Peninsula, Siam, Sumatra, Java.

EXPANSE: 1·0 to 1·25 inches.

DESCRIPTION: MALE. "UPPERSIDE, *both wings* crossed by a broad medial irregular white band broadly bordered on both sides with blue, the outer margins broadly dark brown. UNDERSIDE, *both wings* white, crossed near the base by two dark brown bands, and near the outer margin by a double series of brown spots. *Forewing* with a large spot on the costal margin near the apex, a similar spot on the inner margin, and a small spot between them, dark brown. *Hindwing* with a band of three large spots below the middle, two black spots bordered with silver at the anal angle." (*Hewitson*, l. c.) "FEMALE. UPPERSIDE very like *C. roxus*, Godart, but with the white band extending nearly to the costa of the *forewing*, internally excavated and externally broadly truncate-clavate at its upper extremity. UNDERSIDE, *both wings* white, spotted with dark brown, as in the male." (*Butler*, l. c.)

C. ethion is a very beautiful species, the iridescent blue of the upperside of the male being of a very lovely shade. The female lacks this colour altogether, its place being taken by black.

Mr. G. F. Hampson states that it is "common on the lower slopes of the Nilgiris." In Ceylon it occurs at Galle and Kandy, very common (*Wade*). There are two old specimens from Sylhet and the Naga Hills in the Indian Museum, Calcutta (these localities however require confirmation); it occurs at Chittagong, and Dr. J. Anderson obtained it in the Mergui Archipelago. Mr. Distant records it from Sunjei Ujong and Malacca, and Mr. Butler from Singapore, all in the Malay Peninsula.

762. **Castalius airavati**, Doherty. (Frontispiece, Fig. 133 ♂).

C. airavati, Doherty, Journ. A. S. B., vol. lv, pt. 2, p. 261, n. 16 (1886).

Habitat: Gonyi, Great Nicobar.

Expanse: ♂, 1·3; ♀, 1·2 inches.

Description: "Allied to *C. ethion*, Doubleday and Hewitson. Male. Upperside, *both wings* light, shining blue, the outer borders broadly, and the costa of the forewing narrowly black; a white band crosses both wings which has its upper part wide in the forewing, centering between the third median and lower discoidal nervules, thence to the hind margin it is slender and almost obsolescent; on the hindwing it is narrow and angular. Underside, *both wings* with the ground ochreous-white (it is white in *C. ethion*), pure white on the lower part of the forewing. It differs from *C. ethion* below in the increased size of all the black markings. The transverse discal band across the hindwing, though irregular, is continuous, its two parts very close together, the upper one is widely united near the costa with the outer of the two oblique basal stripes; the latter are united in both wings, enclosing a narrow white band. The two lines of submarginal spots are less equal and regular than in *C. ethion*, the inner one being very large and forming an almost continuous and very heavy lunular line; the anal and subanal black spots are edged with silvery blue. Tail shorter than in *C. manluena*, Felder." (*Doherty*, l. c.) Female. Upperside, *both wings* entirely lacking the blue gloss of the male; the discal white band rather broader. Underside, *both wings* as in the male.

Mr. E. H. Man has sent me four males and two females of this species from Great Nicobar. It is a very distinct as well as beautiful species. In only one of my specimens is the discal black band on the underside of the hindwing united near the costa with the outer of the two basal bands, as will be seen from my figure of the species.

The figure shows both sides of a male specimen from Great Nicobar in my collection.

763. **Castalius roxus**, Godart.

Polyommatus roxus, Godart, Enc. Méth., vol. ix, p. 659, n. 142 (1823); *Lycæna roxus*, Horsfield, Cat. Lep. E. I. C., p. 70, n. 5, pl. ii, figs. 4, 4*a*, *female imago*; 4*b*–*f*, *structure of imago* (1828); *Cupido roxus*, Druce, Proc. Zool. Soc. Lond., 1873, p. 348, n. 3; *Castalius roxus*, Butler, Trans. Linn. Soc. Lond., Zoology, second series, vol. i, p. 547, n. 3 (1877); id., Moore, Proc. Zool. Soc. Lond., 1878, p. 833; id., Wood-Mason and de Nicéville, Journ. A. S. B., vol. l, pt. 2, p. 248, n. 51 (1881); id., Distant, Rhop. Malay., p. 216, n. 3, pl. xxii, fig. 24, *male* (1884); id., Elwes and de Nicéville, Journ. A. S. B., vol. lv, pt. 2, p. 428, n. 92 (1886).

Habitat: Andaman Isles, Burma, Malay Peninsula, Sumatra, Java, Borneo, Philippines.

Expanse: ♂, ♀, 1·1 to 1·2 inches.

Description: "Male. Upperside, *both wings* blackish-brown, with a very broad band of yellowish-white, situated on the posterior edge [inner margin], arising on the disc of the forewing, and passing obliquely over the disc and base of the hindwing. *Cilia* grayish. Underside, *both wings* white, inclining to pale yellow; with a broad fascia of blackish-brown, extending from the middle of the costa of the forewing obliquely over the base of the hindwing to the thorax; at the point where it meets the costa commences a curved, irregularly-interrupted macular fascia, consisting of diversified spots and patches of blackish-brown. *Forewing* has exterior to this a narrow brown margin, regularly waved at its inner edge, bearing a row of oblong yellowish spots. *Hindwing* has a series of uniform lunulæ directed outwards, touching a narrow black marginal streak and inclosing a series of white lineolæ, in continuation

of the marginal markings of the forewing. *Head, thorax,* and *body,* deep blackish-brown above, yellowish underneath ; *abdomen* banded with yellow at the sides ; *antennæ* marked with delicate annuli. *Tail* filiform, black, tipt with white. FEMALE with the wings broader and more expanded than in the male, and the abdomen more robust. UPPERSIDE, *forewing* with the transverse band approaching nearer to the costa than in the male, its posterior edge more deeply sinuated. *Hindwing* has an interrupted row of obscure yellowish lineolæ, parallel with the margin." (*Horsfield,* l. c.)

The female of *C. roxus* may be known from that sex of *C. ethion* by having only one basal black band across both wings on the underside, while the latter has two such bands. Dr. Horsfield in 1829 recorded that "Hitherto this species has only been found in Java: it occurs, in considerable numbers, in the skirts of large forests ; but from the great delicacy of the wings it is not easily obtained in a perfect state." Further and later experience has shown that it has a wide distribution. But within our limits it is distinctly rare, the only specimens I possess being two taken in the Thoungyeen forests, Upper Tenasserim, one in March, the other in the autumn, and a few from the Andaman Isles. Mr. Moore records it from Moulmein to Meetan : Colonel Lang, R.E., took one specimen in the Tenasserim Valley in March : and the collector of the Indian Museum, Calcutta, obtained it at Ponsekai on the borders of Siam. Mr. Distant records it from Sunjei Ujong and Malacca, and Mr. Butler from Singapore, all in the Malay Peninsula. It has been recorded also from several islands in the Malay Archipelago. Mr. Elwes records it* from Sikkim as "common up to 4 or 5,000 feet from April to October." He has wrongly identified the species, which does not occur in Sikkim at all.

764. Castalius manluena, Felder.

Lycæna manluena,† Felder, Verh. zool.-bot. Gesellsch. Wien, vol. xii, p. 484, n. 117 (1862) ; *Castalius manluena,* Moore, Proc. Zool. Soc. Lond., 1877, p. 587 ; id., Doherty, Journ. A. S. B., vol. lv, pt. 2, p. 261, n. 15 (1886); idem, id., l. c., vol. lviii, pt. 2, p. 134, pl. x, fig. 8, *male* (1889).

HABITAT : Kondul (*Felder*) ; Ikuya, Little Nicobar (*Doherty*).

EXPANSE : ♂, 1·05 inches.

DESCRIPTION : "FEMALE. Wings very shortly tailed, fuscous-brown on both sides, a common sinuate discal fascia and marginal spots white. UNDERSIDE with a white vitta at the base of the costa of the *forewing,* and a common external white fascia, inwardly sinuate, outwardly undulate."

"A female, much smaller than *L.* [= *C.*] *roxus,* Godart, which appears to be the nearest allied species. The white spots on the margin arranged in rows on the upperside, and the absence of the short white band at the base of the costa on the underside of the hindwing are the only satisfactory distinguishing features of the new species." (*Felder,* l. c.)

"MALE. UPPERSIDE, *both wings* black, with a broad white discal band, extending on the forewing from the hind margin to above the lower discoidal nervule, just entering the cell, at the end of which it is strongly indented from above ; prolonged outwardly between the second and third median nervules ; on the hindwing it is broad, strongly produced outwardly, acutely indented inwardly. *Hindwing* with a slender marginal white line, broken at the veins ; tip of tail white. UNDERSIDE. *Forewing,* ground-colour white, base dark with a white longitudinal line close to the costa ; a black mass extending obliquely from the base of the hind [inner] margin to the middle of the costa, where it joins a broad black subapical area which extends thence to the second median nervule, there it is connected (slightly) with the broad submarginal dark band, and with an outer discal dark area lying between the third median nervule and the hind margin. *Hindwing* with a basal black mass untouched with white, and a discal band, irregular but unbroken, crossing the wing, and a submarginal line of wide, joined black lunules uniting at the apex with the discal band. Allied to *C. roxus,* Godart."

* *Castalius roxus,* Elwes, Trans. Ent Soc Lond., 1888, p. 386, n. 268.
† "What Doctors are called in the Nicobar Islands." (*Felder,* l. c.)

"A male taken by me at Ikuya, Little Nicobar. The prehensores are quite distinct from those of the next species [*C. airavati*, Doherty]. The species is without metallic markings either above or below. Felder's female, with which this male seems conspecific, is, as he remarks, distinguished from *C. roxus*, Godart, and allied species by the absence of all white at the base of the costa of the hindwing below. This also distinguishes it from *C. airavati*, Doherty. The unbroken transverse discal band of the hindwing distinguishes the two Nicobarese species from all others. The female has, according to Felder, white marginal spots on both (?) wings above." (*Doherty*, l. c.)

Through the kindness of Mr. W. Doherty I have seen the unique specimen in his possession described as above. On the underside the black markings occupy quite one-half of the surface; in *C. roxus* they do not occupy more than one-fourth. The two species seem to be abundantly distinct.

765. **Castalius elna**, Hewitson.

Lycæna elna, Hewitson, Ex. Butt., vol. v, *Lycæna* pl. 1, fig. 8, *female* (1876); *Castalius elna*, Moore, Proc. Zool Soc. Lond., 1877, p. 587; id., Wood-Mason and de Nicéville, Journ. A. S. B., vol. l, pt. 2, p. 248, n. 50 (1881); id., Distant, Rhop. Malay., p. 217, n. 4, pl. xx, fig. 4 (1884).

HABITAT: Sikkim, Bhutan, Assam, Orissa, Upper Tenasserim, South Andaman Isles, Malay Peninsula, Java.

EXPANSE: ♂, ♀, 1·2 to 1·4 inches.

DESCRIPTION: MALE and "FEMALE. UPPERSIDE, *both wings* dark brown, crossed by a common broad white band commencing at the first discoidal nervule of the forewing where it is marked by a minute black spot and projects outwards. UNDERSIDE, *both wings* white, crossed near the base by a broad band of black [elbowed in the forewing]. *Forewing* with a large spot near the apex, a similar spot near the anal angle, the apex, the outer margin, and a spot at its middle, all black. *Hindwing* with a spot near the apex, a quadrifid band above the anal angle, the outer margin, and a submarginal series of lunular spots, all black." (*Hewitson*, l. c.)

"Specimens of both sexes from the Andamans are variable in the size and connections of the black spots and bands of the underside, and want the minute black spot at the anterior end of the common white band of the upperside." (*Wood-Mason* and *de Nicéville*, l. c.)

This is a very common species in Sikkim. In the rains form the white discal band of the upperside is very narrow, in some specimens not more than 1/16 of an inch in width on the forewing, the markings of the underside deep black. In those specimens which occur in the cold dry weather the discal white band on the upperside of the forewing occupies half the wing, while all the hindwing is white, except a narrow black basal band, and a narrow marginal similar band. On the underside the ground-colour in this form, instead of being white, is suffused with cinnamon colour, and the markings, instead of being black, are cinnamon-brown, approaching to black on the costa, at the anal angle, and at the base of the forewing only. I am not a little surprised that this very distinct seasonal form should have hitherto escaped being described as a "new species."

The occurrence of this species in an isolated locality like Orissa is not a little remarkable, though that district shows many similar instances. It is a common species in the Andaman Isles, but does not appear to occur in the Nicobars, and it is recorded by Mr. Distant from Sunjei Ujong, Malacca, and Singapore in the Straits Settlements.

766. **Castalius decidia**, Hewitson.

Lycæna decidia, Hewitson, Ex. Butt., vol. v, *Lycæna* pl. i, fig. 4 (1876); *Castalius decidia*, Moore, Lep. Cey., vol. i, p. 84 (1881); *C. hamatus*, id., l. c., p. 84, pl. xxxvi, figs. 6, 6*a* (1881); *C. interruptus*, de Nicéville, Journ. A. S. B., vol. lii, pt. 2, p. 74, n. 13, pl. i, fig. 12, *female* (1883); id., Moore, Proc. Zool. Soc. Lond., 1883, p. 523, pl. xlviii, fig. 4.

HABITAT: Bombay, Rohilkund Terai, Malda, Sikkim, Assam, Burma, Orissa, Ganjam, Nilgiris, Travancore, Ceylon.

EXPANSE: ♂, ♀, 1·0 to 1·3 inches.

DESCRIPTION: MALE and FEMALE. "UPPERSIDE, *both wings* dark brown, crossed by a common broad band of white commencing at the lower discoidal nervule of the forewing where it projects towards the outer margin. UNDERSIDE, *both wings* white. *Forewing* with a small spot at the base, a band before the middle, a large spot on the costal margin near the apex, a large spot at the anal angle; the apex (which is marked by two white spots), the outer margin and a spot at its middle, all dark brown. *Hindwing* with a band near the base, a small spot on the inner margin, a large spot below this, a bifid spot near the apex, a spot between these, and a series of submarginal lunular spots, all dark brown." (*Hewitson*, l. c.)

Mr. E. E. Green sends me the following note on the transformations of this species in Ceylon under the name *C. hamatus*, Moore. "LARVA feeds upon the leaves of *Gouania microcarpa*. Colour pale bright green, with two dorsal stripes of a darker shade; a lateral fringe of very fine soft hairs; segments expanded laterally into small flattish lobes. PUPA pale pink, miuutely speckled with brown, and with a dark brown median line."

The butterfly is found in the "Western and Central Provinces of Ceylon. Plains and Hills up to 4,000 feet. Common in low-country forests from June to October. Flits about the tops of shrubs and low trees, settling among the leaves." (*Hutchison* in Lep. Cey.)

"*C. decidia*, Hewitson, *C. hamatus*, Moore, and *C. interruptus*, de Nicéville, are probably all forms of one species, differing only in the extent of the black markings, which are more extensive in the first, less so in the second, and still more restricted in the last. *C. decidia* is found commonly on the lower slopes of the Nilgiris." (*G. F. Hampson*). Mr. Hampson has made a slight mistake, it is *C. hamatus*, and not *C. decidia*, which has the black markings on the underside the most extensive.

"I believe, but am not quite certain, that I have caught *C. decidia* in Bombay. It is not uncommon on the hills." (*Aitken*, Journ. Bombay Nat. Hist. Soc., vol. 1, p. 217, n. 59 (1886).

C. decidia exhibits seasonal dimorphism to a greater extent even than *C. elna*, Hewitson, and exactly in the same direction. It has not been so fortunate, however, as that species in having these forms unnamed. In all localities where there are two well-marked seasons, we find *C. decidia* putting forth corresponding varieties, the darkest form of course occurring in the middle of the rains, the lightest in the middle of the dry-season, and intermediate forms between these seasons. I give below as foot-notes the descriptions of *C. hamatus*, Moore, and *C. interruptus*, mihi.*

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* *Castalius hamatus*, Moore, Lep. Cey., vol. i, p. 84, pl. xxxvi, figs. 6, 6*a* (1881). HABITAT: Nilgiris (*Hampson*), Ceylon (*Moore*). EXPANSE: *Male* and *female*, 1·25 inches. DESCRIPTION: "MALE. UPPERSIDE, *both wings* dark violet-black, with a narrow white medial discal transverse band, which is attenuated and hooked outwards at its anterior end below the costa [on the forewing], the band on both wings is also crossed by black veins, and thickly black-speckled on the hindwing. *Cilia* white alternated with black. UNDERSIDE, *both wings* white. *Forewing* with [a spot at the base], a broad black subbasal band curving inwards from the costa, an oblique short subapical and a lower discal band, a marginal lunular band which is dilated at both ends and projected inwards from the middle. *Hindwing* with a black basal curved band, a small contiguous spot on the abdominal margin, a large upper and lower irregular discal spots, and a smaller intervening spot, a marginal row of lunules. FEMALE. UPPERSIDE, *both wings* with the white band broader and more acutely hooked in the forewing than in the male. UNDERSIDE, *both wings* as in the male. *Palpi* black above. *Legs* black with white bands." (*Moore*, l. c.)

"Galle and Kandy. Very common." (*Wade*). "Found rarely on the lower slopes of the Nilgiris." (*G. F. Hampson*).

Castalius interruptus, de Nicéville, Journ. A. S. B., vol. lii, pt. 2, p. 74, n. 13, pl. i, fig. 12, *female* (1883); id, Moore, Proc. Zool. Soc. Lond., 1883, p. 523, pl. xlviii, fig. 4. HABITAT: Bombay; Rohilkund Terai; Bholahât, Malda; Sikkim; Shillong, Assam; Khurda, Orissa; Nilgiris. EXPANSE: 1·00 to 1·20 inches. DESCRIPTION. "MALE and FEMALE. UPPERSIDE, *both wings* pure white. *Forewing* with the base thickly irrorated with black scales, beyond with a dense black patch widest on the costa, inwardly recurved below the submedian nervure, from whence it suddenly narrows. In some specimens the irrorated black scales at the base of the wing and the black patch beyond are entirely merged into one black basal patch, and the costa throughout is widely black. The apex widely, the outer margin as far as the first median nervule less widely, then to the inner margin more widely again deep black; with a round black spot above the first median nervule coalescing with the black border, this spot is sometimes entirely separated, in other specimens very indistinct, and lastly in others its form is entirely lost in the black margin. *Hindwing* with the immediate base and a few irrorated spots beyond black, the outer margin also black, enclosing immediately within a black anteciliary fine line a more or less prominent and complete series of white oblong marks between the nervules. UNDERSIDE, *both wings* with the markings arranged as in *C. hamatus*, Moore, but smaller and more restricted, especially on the *hindwing*. *Cilia* on both sides on both wings white,

C. decidia may instantly be distinguished from *C. elna* by the presence, in every variety of it, of a clavate longitudinal black mark at the extreme base of the forewing on the underside. In Sikkim it is a common species both in the lower hills and Terai, extending eastwards to Shillong. Along the foot of the Himalayas it is recorded from as far west as Rohilkund, where Colonel Lang, R. E., took it (the *interruptus* form) in the Sâl forests of the Terai in the north of the Pilibhit district in December. It occurs also in the Chittagong Hill Tracts; Major C. H. E. Adamson has sent me a specimen taken at Bhamo, Upper Burma, in July; Mr. W. H. Irvine has obtained long series of it at Bholahât, in the Malda district; as also has Mr. W. C. Taylor in Orissa. It is common in the Nilgiris and Ceylon, and occurs in Bombay.

Genus 124.—POLYOMMATUS, Latreille. (PLATE XXVII).

Polyommatus, Latreille, Sonnerat's Buffon, vol. xiv, p. 116 (1805); idem, id., Gen. Crust. et Ins, vol. iv, p. 206 (1809); id., Moore, Lep. Cey., vol. i, p. 93 (1881); id., Distant, Rhop. Malay., p. 230 (1884).

"FOREWING, triangular; *costa* slightly arched, *exterior margin* oblique and slightly convex towards the apex, *posterior* margin straight; *costal nervure* extending to half length of wing; *first subcostal nervule* short, emitted at nearly one-half before the end of the discoidal cell, *second* subcostal short, emitted at one-fifth before the end of the discoidal cell, *third* subcostal bifid, and emitted close to the end of the cell, *fourth* subcostal at one-half from the third and terminating at the apex, *fifth* subcostal [upper discoidal] from the end of the cell; [*middle* and *lower*] *disco-cellular* nervules nearly erect, of equal length, radial [*lower discoidal*] nervule from their middle; *discoidal cell* broad, extending to a little beyond half length of the wing; *third median nervule* from the end of the cell, *second* median at one-fifth, and *first* median at one-third before the end of the cell; *submedian nervure* nearly straight. HINDWING, bluntly oval, furnished with a single slender tail [at the termination of the first median nervule]; *costal nervure* much arched from the base; *first subcostal nervule* curved, emitted at one-fourth before the end of the cell; *disco-cellular* nervules very slender, *upper* disco-cellular slightly concave, *discoidal* nervule from their middle; *third* and *second median* nervules from the end of the cell, *first* median at one-third before the end; *submedian nervure* straight, *internal* nervure recurved, short. BODY stouter than in *Lampides*, Hübner; *palpi* porrect, long, slender, flattened, fringed beneath; *legs* slender; *antennæ* with the club stout, grooved; *eyes* hairy. Type, *P. bœticus*, Linnæus." (*Moore*, l. c.)

Forewing has the first subcostal nervule emitted beyond the middle of the discoidal cell, quite free from the costal nervure, second subcostal emitted much nearer to the base of the upper discoidal than to the base of the first subcostal nervule, third subcostal emitted at about midway between the base of upper discoidal and apex of wing, middle and lower disco-cellular nervules nearly erect, of nearly equal length and slightly concave, second median nervule emitted long before the apex of the cell. Hindwing, disco-cellular nervules outwardly oblique, of equal length, concave; second median nervule emitted just before the apex of the cell. The transformations are described under *P. bœticus*.

Until lately, *Polyommatus* has been confined to a single species, but Mr. Distant has described *P. bagus* from apparently a single female example only from Province Wellesley. It is not improbably an aberration or "sport" of *P. bœticus*. The typical species (*P. bœticus*) is violet-blue on the upperside of the male, the coloration having a frosted appearance owing to the presence of very long hair-like scales over the entire surface. There is a conspicuous black

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marked with a black spot at the tip of each nervule. *Tail* black with a white tip. The male differs from the female only in having the apex of the forewing more produced."

"Closely allied to *C. decidia*, Hewitson, and to *C. hamatus*, Moore, but differing from Ceylon specimens of the latter in that the black markings on the upperside of both wings are far more restricted, and on the underside of the hindwing the markings are much smaller and partially separated into spots." (*de Nicéville*, l. c.)

MALE and FEMALE. "UPPERSIDE, *forewing* white, with a blackish-brown broad costal band, which is widely interrupted to near the costal edge at the end of the cell, the subapical inner angle of the band acute, the band then extending down the exterior margin and ascending above the posterior angle into a clavate knob to the disc. *Hindwing* white, base slightly black-speckled; a very narrow marginal band traversed by white lunules along the outer edge. UNDERSIDE marked similarly to *C. decidia*, Hewitson." (*Moore*, l. c.)

"Bombay" (*Moore*). "Found commonly on the lower slopes of the Nílgiris." (*G. F. Hampson*).

As above recorded this form has been taken in the Sâl forests of the Terai in the North of Rohilkund in December by Colonel Lang.

spot on the outer margin of the hindwing just beyond the base of the tail, and two smaller spots interior to it. The underside is quite unique amongst the true " blues, " being furnished throughout the hindwing and largely on the forewing with short transverse brown lines margined with whitish, on the hindwing there is usually a conspicuous submarginal white or whitish band, and two black spots at the anal angle spangled with metallic silvery. The female is not frosted like the male, the upperside is fuscous, the base and disc of the wings metallic bluish, the hindwing with a marginal series of black spots and a discal macular pale band. *P. bœticus* has an immense range in the old world, and occurs in Australia ; in this respect it is only surpassed by *Everes argiades*, Pallas, which is found in North America as well.

767. **Polyommatus bœticus,** Linnæus. (PLATE XXVII, FIG. 190 ♂).

Papilio bœticus, Linnæus, Syst. Nat., ed. xii, vol. i, pt. 2, p. 789, n. 226 (1767) ; id., Fabricius, Syst. Ent., p. 522, n. 333 (1775) ; idem, id., Sp. Ins., vol. ii, p. 119, n. 529 (1781) ; idem, id., Mant. Ins., vol. ii, p. 69, n. 657 (1787) ; id., Esper, Schmett., vol. i, pt. 1, pl. xxvii, figs. 3*a*, *b* (1778) ; pt. 2, pl. xci, fig. 3 (1784) ; id., Hübner, Eur. Schmett., vol. i, figs. 373, 374, *male* ; 375, *female* (1798-1803) ; *Polyommatus bœticus*, Godart, Enc. Méth., vol. ix, p. 653, n. 122 (1823) ; *Lampides bœticus*, Butler, Cat. Fab. Lep. B. M., p. 165, n. 11 (1869) ; id., Semper, Journ. Mus. Godef., vol. xiv, p. 158, n 63 (1879) ; *Lycæna bœticus*, Snellen, Tijd. voor Ent., vol. xix, p. 152, n. 45 (1876) ; *Cupido bœticus*, Aurivillius, Ofv. Vet.-Ak. Förh., vol. xxxvi, p. 44, n. 12 (1879) ; id., Snellen, Tijd. voor Ent., vol. xx, p. 66 (1877) ; idem, id., l c, vol. xxi, p. 23, n. 90 (1878) ; id., Wollaston, Ann. and Mag. of Nat. Hist., fifth series, vol. iii, p. 223 (1879) ; *Hesperia bœtica*, Fabricius, Ent. Syst., vol. iii, pt. 1, p. 280, n. 77 (1793) ; *Lycæna bœtica*, Horsfield, Cat. Lep. E. I. C., p. 80, n. 14 (1828) ; id., Boisduval, Sp. Gén., vol. i, pl. vii, fig. 9, *male* (1836) ; id., Miller, Ann. Soc. Linn., Lyons, 1861, p. 229, pl. iv, figs. 1-6 ; id., Guénee, Ann Soc. Ent. France, fourth series, vol. vii, p. 665, pl. xiii, figs. 9-12, *five posterior segments of larva showing special organs* (1867) ; id., Lang, Butt. Eur., p. 99, n. 1, pl. xxii, figs. 2, *male* and *female* ; pl. xxviii, fig. 5, *pupa* (1884) ; *Lampides bœtica*, Walker, Ent., vol. v, p. 52, n. 2 (1870) ; id., Newman, Britt. Butt., p. 117, fig. 39 (1874) ; *Lycæna bœtica*, Trimen, Rhop. Afr. Aust., vol. ii, p. 236, n. 138 ; also p. 342 (1866) ; id., Elwes, Proc. Zool. Soc. Lond., 1881, p. 887 ; id., Trimen, South Afr.-Butt , vol. ii, p. 58, n. 147 (1887) ; id., Pryer, Rhop. Nihonica, p. 17, n. 50, pl. iv, fig. 22, *male* (1888) ; *Cupido bœticus*, Kirby, Syn. Cat. Diurn. Lep., p. 354, n. 114 (1871) ; *Lampides bœticus*, Butler, Trans Linn. Soc. Lond., Zoology, second series, vol. i, p. 547, n. 6 (1877) ; *Lycæna bœticus*, Mabille, Bull. Soc. Zool. Fr , 1877, p. 215 ; *Polyommatus bœticus*, Moore, Lep. Cey., vol i, p. 93 (1881) ; id., Butler, Trans. Ent. Soc. Lond., 1882, p. 31, n. 1 ; id., Distant, Rhop Malay., p. 214, fig. 64, *neuration of forewing* ; p. 230, n. 1, pl. xx, figs. 8, *male* ; 1, *female* (1884) ; *Papilio coluthea*, Fuessly, Schweiz. Ins., p. 31, n 594, figs. 2, 2 (1775) ; *Papilio damoëtes*, Fabricius, Syst. Ent., p. 526, n. 350 (1775) ; idem, id., Sp. Ins., vol. ii, p 124, n. 558 (1781) ; idem, id., Mant., Ins. vol. ii, p. 77, n. 707 (1787) ; id., Donovan, Ins. New Holl., pl. xxxi, fig. 2 (1805) ; *Hesperia damoëtes*, Fabricius, Ent. Syst., vol. iii, pt. 1, p. 303, n. 148 (1793) ; *Polyommatus damoëtes*, Godart, Enc. Méth., vol. ix, p. 680, n. 198 (1823) ; *Lycæna damoëtes*, Horsfield, Cat. Lep. E. I. C., p. 81, n. 16 (1829) ; *Papilio damœtas*, Esper, Gesch. eur. Schmett., pl. xxviii, figs. 1*a*, *larva* ; 1*b*, *pupa* ; pl. xxix, figs. 1*a*, *larva* ; 1*b*, *pupa* ; pl. xxix, figs. 1*a*, *larva* ; 1*b*, *pupa* (1806—18) ; *Papilio pisorum*, Fourcroy, Ent. Paris, vol. ii, p. 242, n. 25 (1785) ; *Papilio archias*, Cramer, Pap. Ex., vol. ii, pl. clxxxi, fig. C (1777) ; *Lycæna archias ?* Herrich-Schäffer, Stett. Ent. Zeit, vol. xxx, p. 73, n. 28 (1869).

HABITAT : England (rarely), South Europe (excepting eastern portions), Central and South-West France, Switzerland, Germany, Belgium, Madeira, Canary Isles, Teneriffe, St. Helena, Madagascar, Mauritius, Bourbon, almost throughout Africa, almost throughout Asia (except the northern portions and Amurland), China, Japan, Ceylon, Nias Island, Sumatra, Java, Batchian, Waigiou, Bantam, Celebes, Ceram, Aru, Duke of York Island, Australia, Sandwich Islands, Hawaiian Islands.

EXPANSE : ♂, ♀, ·9 to 1·6 inches (Indian specimens).

DESCRIPTION : "MALE. UPPERSIDE, *both wings* pale violaceous [thickly overlaid with long hair-like scales, giving the wings a frosted appearance]. *Forewing* with the costal margin narrowly and the outer margin more broadly pale fuscous. *Hindwing* with the costal and posterior margins pale fuscous, a large black marginal spot between the second and first median nervules, and two contiguous smaller black spots at the anal angle ; [*tail* black, outwardly fringed to near the tip and the extreme tip white.] UNDERSIDE, *both wings* pale brownish-ochraceous, with the following linear brownish fasciæ margined with greyish :—*forewing* with two crossing the middle and two near the end of the cell, two (considerably fractured), crossing the wing between the end of the cell and the outer margin, commencing near

the fourth subcostal nervule [terminal portion of subcostal nervure] and terminating at the submedian nervure, two submarginal (the innermost broadest), and the outer margin narrowly pale fuscous:—*hindwing* crossed from the base to beyond the middle with about eight linear fasciæ as on the forewing (more or less fused and broken), followed by a distinct and somewhat broad greyish fascia, and with two submarginal linear brownish fasciæ; two large marginal spots containing a few scattered greenish [metallic] scales, and inwardly margined with pale reddish-ochraceous, separated by the first median nervule; the outer margin narrowly fuscous. *Cilia* of both wings pale brownish, the tips greyish-white. *Body* above more or less concolorous with the wings, beneath greyish-white. *Legs* greyish-white, more or less streaked with brownish. FEMALE. UPPERSIDE, *both wings* pale brownish. *Forewing* with a discal bluish patch. *Hindwing* with [the base irrorated with iridescent blue], two outer greyish submarginal fasciæ, the intermost broadest; black anal angular spots as in the male, distinctly margined with greyish. UNDERSIDE, *both wings* as in the male." (*Distant*, l. c.)

LARVA when full-grown measures 7/16 of an inch in length; pale dull green throughout, slightly shagreened, but not hairy, except slightly so at the sides; the small retractile head smooth, ochreous pale brown, shining; a dorsal line of a somewhat darker green than the ground, no other markings whatever, altogether a very plain looking creature. The constrictions at the segments shallow, the spiracles black but inconspicuous, the usual extensile organs on the twelfth segment very short. Larva feeds on the yellow pea-like flowers and on the pods of *Crotalaria striata*, D. C., in Calcutta. Dr. A. Forel of Geneva has identified the three species of ants which I have found attending this larva in Calcutta as *Camponotus rubripes*, Drury (*sylvaticus*, Fabricius), subspecies *compressus*, Fabricius; *Tapinoma melanocephalum*, Fabricius; and *Prenolepis obscura*, Mayr (var. *clandestina*, Mayr). PUPA pale yellowish-green, the posterior end very blunt and rounded, the abdominal segments larger than the anterior, the head small, a dark dorsal line, a double subdorsal series of small black spots, the thorax slightly humped on the back, the pupa smooth throughout.

Dr. Lang describes the larva in Europe as "green or olive, or sometimes reddish-brown, with a dark dorsal stripe. The spiracles are yellow, and below there is a white lateral stripe; above the spiracles on each segment is an oblique line, paler than the ground-colour. Pupa reddish-yellow, dotted with brown, and with black spiracles. The larva feeds in the pods of the common pea, also on *Colutea arborescens* [the "bladder senna"], and on various leguminous plants, devouring the seeds. The eggs are laid in the autumn on the twigs of the plants, the newly emerged larva entering the young pods in the following summer; when it is fully grown it undergoes its pupation on the stems or in the leaves." Professor Trimen describes the transformations of this species in South Africa as follows:—"Larva bright green, paler on the under surface. A dark green dorsal line; beneath it, on each side, an indistinct line interrupted on each segment, followed by a row of short, oblique, indistinct streaks of the same dark green, and a pale green line just above the legs. Head small, shining, reddish-brown. Two-thirds of an inch in length. Feeds on the flowers of *Crotalaria capensis* (a Papilionaceous shrub), in which it lives. Pupa very pale greyish-ochreous, dusted unequally with blackish, the wing-covers more greenish in tint; a fuscous line down the back, some blackish spots on the head and back, two rows of blackish spots on each side of the back of the abdomen. About half an inch in length; thickest and roundest in abdominal region; head blunt." The Rev. Thomas Blackburn describes the larva as found by him in the Hawaiian Islands as follows:—"Obscure olive-green, pretty thickly sprinkled with short hairs (much the appearance of a bristly surface badly shaved); dorsal and subdorsal lines and the region included obscurely rosy; head testaceous, bearing a black V-shaped mark, which points backwards; the rosy markings vary in intensity, as also the ground-colour; legs of the ground-colour; spiracles white. Onisciform. Feeds in pods of what appears to be a *Melilotus*." (Trans. Ent. Soc. Lond., 1882, p. 31.)

I have given these various descriptions of the transformations of *P. bœticus*, as from them it would appear that the insect is much more variable in the earlier portion of its history than

it is later on as a butterfly. I think this will be found true of very many of the larvæ of the *Lycænidæ*, which, as far as my experience goes, vary in coloration and markings in the most extraordinary and puzzling manner.

Little need be said about this common butterfly with regard to its distribution in India. It occurs almost everywhere, except at very great elevations in the Himalayas, and in perfectly desert regions. It most probably feeds on a great many leguminous plants, and hence can exist almost everywhere. It varies but little except in size, though curious aberrations or "sports" are not very infrequent. Its flight is very rapid but shortly sustained (except when migrating?), and it frequently settles. Colonel Lang reports that at Naini Tal large flights come up in April from the plains flying northwards. Mr. P. W. Mackinnon has remarked the same thing at Masuri in the Spring. If the species is given to migrating, this habit would, in conjunction with the almost universal presence of some species of plant on which the larva can subsist, help to account for its wide distribution in the old world.

The figure shows the upper and undersides of a male specimen from Bholahât in my collection.

An apparently allied species, or, more probably, an aberration or "sport" of *P. bæticus*, has been described as below from a single specimen from the Malay Peninsula.*

The fifth division that I have made in the Indian *Lycænidæ* I call the *Amblypodia* group, and it contains nine genera. The first two genera, *Amblypodia*, Horsfield, and *Iraota*, Moore, may be known from all the other Indian genera, except *Zesius*, Hübner, by having four subcostal nervules (excluding the terminal portion of the subcostal nervure, often called an additional nervule) to the forewing in the male, and three in the female. The additional nervule possessed by the male in these genera is very short, and I am quite at a loss to understand why that sex should alone possess it, its wings being no broader—thus requiring no additional support—than in the female, but being on the contrary, as is usual in that sex, less broad. In both sexes of *Amblypodia* the terminal portion of the subcostal nervure ends on the outer margin some distance below the apex of the wing; this also is the case in *Iraota* in the male only; in the female of *Iraota*, as in all the genera of the Indian *Lycænidæ* which have preceded it (except *Amblypodia*), it ends at the apex of the wing. In these two genera not only is there no upper disco-cellular nervule to the forewing, a feature common to all the other members of the family *Lycænidæ* as far as I am aware, but the middle disco-cellular is also wanting, the lower disco-cellular being alone left. In *Amblypodia* the upper discoidal as usual originates from the subcostal nervure some distance before the apex of the discoidal cell, the lower discoidal is given off from the upper discoidal, and is at first deflected obliquely downwards, its basal portion apparently forming a middle disco-cellular nervule. In *Iraota* the arrangement is again different, the discoidal nervules having almost a common origin, so there is no pretence even of a middle disco-cellular. These two genera are certainly the most aberrant in venation of all the genera of the Indian *Lycænidæ*. The male in *Amblypodia* has no secondary sexual characters; both sexes have a lobe to the hindwing, with a rather broad but short tail beyond from the termination of the submedian nervure. The males are dark purple or rich ultramarine blue on the upperside, with no markings beyond an outer black border. The underside of both sexes is without defined markings, but is more or less mottled and blotched with brown of various shades, and resembles a dead leaf very closely, a mid-rib like band crossing the wings as in the genus *Kallima*, Westwood, from the apex of the

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* *Polyommatus bagus*, Distant, Ann. and Mag. of Nat. Hist., fifth series, vol. xvii, p. 532 (1886); idem, id., Rhop. Malay., p. 457, n. 2, pl. xliv, fig. 13, *female* (1886). HABITAT: Province Wellesley. EXPANSE: *Female*, 1·2 inches. DESCRIPTION: "FEMALE. UPPERSIDE, *both wings* closely resembling those of the same sex of *P. bæticus*, Linnæus. UNDERSIDE, *both wings* pale brownish-ochraceous, with the following linear brownish fasciæ margined with greyish:—two at the end of the discoidal cells and two submarginal fasciæ, the innermost broadest. *Hindwing* with two large, marginal, blackish spots, containing a few scattered greenish scales, inwardly margined with pale reddish-ochraceous, and separated by the first median nervule. *Body* above more or less concolorous with the wings, beneath with legs greyish-white; *legs* more or less streaked with brownish." (*Distant*, l. c. in Rhop. Malay.)

forewing to the abdominal margin of the hindwing. The females have the blue or purple coloration of the upperside confined to the disc and base of the wings. The genus is strictly confined to the Indo-Malayan region. The male of *Iraota* has a small tuft of hairs on the inner margin of the forewing near the middle on the underside. Both sexes have a large anal lobe to the hindwing; the male has a tail as in *Amblypodia,* and sometimes a rudimentary tail beyond from the termination of the first median nervule; the female always has this second tail long, the inner tail much longer than in the male, and sometimes it has a third rudimentary tail from the termination of the second median nervule. Both sexes are coloured on the upperside much as in *Amblypodia*, but the blue colour of the male is richly metallic; the markings of the underside are more variegated than in *Amblypodia,* rich silvery spots and blotches often being present, and there is no protective resemblance to a dead leaf. It has almost the same geographical range as has *Amblypodia,* but occur in China also.

The next genus, *Surendra,* Moore, has no secondary sexual characters in the male. Its neuration is most ordinary, resembling that of the *Lycæna* and *Polyommatus* groups. The middle and lower disco-cellular nervules of the forewing are of almost equal length. The outline of the hindwing in the different species shows great variation. In the type species, *S. quercetorum,* Moore, both sexes have an anal lobe, the male one tail from the termination of the first median nervule, the female two from the first and second median nervules respectively. In *S. amisena,* Hewitson, the arrangement is the same, but the tails and anal lobe are much smaller. In *S. florimel,* Doherty, the tails and lobe have entirely disappeared. These two last-named species have been added to the Indian list since my key to the genera of Indian *Lycænidæ* was printed. The males are purple on the upperside with an outer black border; the females of *S. quercetorum* and *S. florimel* are entirely fuliginous-brown on the upperside; the female of *S. amisena* is dull lilac-blue. The coloration of the underside of both sexes of all the species is dull brown, with some obscure whitish, darker brown, and black markings. The genus occurs in India, Ceylon, the Andaman Isles, the Malay peninsula, the Island of Nias, and in Java.

The next five genera may be known by the middle disco-cellular nervule of the forewing being extremely short, only one-third or one-fourth as long as the lower disco-cellular; and the three median nervules of the forewing originating very close together, the first median nervule from a distinct angle of the median neryure, the latter being deflected upwards beyond the base of the first median nervule; the third subcostal nervule of the forewing also is very short. None of these genera possess secondary sexual characters in the male. The first genus, *Apporara,* Moore, contains but a single species found in Burma, which I have been able to examine since my key to the genera was struck off. It has the subcostal nervules of the forewing as in the other genera of this subgroup; it has a single tail in the hindwing from the termination of the first median nervule, but the outer margin of that wing is throughout very irregular, being more or less toothed at the terminations of all the nervules. The apex of the hindwing is strongly produced upwards or toothed as in the genus *Mahathala,* Moore, the costa between the apex and the base of the wing being at first concave, then straight. Both sexes are purple on the upperside, with broad outer black margins, the underside is brown, mottled and variegated with darker and lighter shades, these markings being arranged in spots and bands, the hindwing sparsely sprinkled with metallic green scales. The next genus, *Thaduka,* Moore, also contains but a single species, and is found only in Burma. Its male appears to be unknown, but the female may be recognised from all Indian *Lycænidæ* (except some aberrant species of the genus *Iraota*) by possessing three well-formed tails to the hindwing besides a very large anal lobe. *T. multicaudata,* Moore, is marked and coloured very much like the single species of *Apporara,* but the apex of the forewing is distinctly acuminate, instead of truncate, and the apex of the hindwing is not produced upwards or hooked as in that species.

I am inclined to think that it would have been better to reduce the three following genera to one, and to use the name *Arhopala,* Boisduval, for the combined genus. They differ but little in neuration, have much the same general *facies,* and all are of some shade of blue or

purple on the upperside, save a few species of the genus *Arhopala*, which are brilliant metallic green in the males. *Arhopala* is the largest genus in the family, and it would be of the greatest service to systematists if it could be satisfactorily split up. This has been attempted by Messrs. Moore and Doherty, with, I think, but indifferent success; at any rate I am not prepared to accept the genera which have been proposed, as the characters on which they are based may not be constant and are not easily recognisable. The genus *Arhopala* in its unrestricted sense includes species with a moderate-sized tail at the termination of the first median nervule to the hindwing, with a very short tail on either side of it, these small tails are sometimes absent leaving one moderate-sized tail only, sometimes again this last is also wanting, and the hindwing is quite entire. Some species have an anal lobe, others lack it entirely. The genus occurs in the Indo-Malayan region, and in China, Japan, and Australia. The next genus, *Acesina*, Moore, contains but two species, occurring in N.-E. India and Burma respectively. They have a well-formed tail to the hindwing, and may be recognised by their rather peculiar style of markings on the underside. The genus *Mahathala*, Moore, contains but a single species, which occurs in N-E. India, thence southwards through Burma to the Malay Peninsula and Siam, reappearing in the Island of Hainan. Like the genus *Apporara*, it has the apex of the hindwing strongly produced hook-like, and has a single spatulate tail from the termination of the first median nervule. The markings of the underside of *M. ameria*, Hewitson, are very different from those of *Apporasa atkinsoni*, Hewitson, however, and entirely lack the scattered green metallic scales found in that species.

The last genus of the *Amblypodia* group, the *Curetis* of Hübner, probably has nothing whatever to do with the group; it is quite aberrant and stands alone, and I do not know where better to place it. In neuration it is aberrant, the subcostal nervure of the forewing terminating below the apex on the outer margin in both sexes. The arrangement of the median nervules of the forewing reminds one much of that obtaining in the *Arhopalas*. The males of all the species are rich orange-red on the upperside with varying widths of black margin; the females have this red colour replaced by ochreous or by white. The hindwing is not tailed; but both wings vary much in outline, being in some species quite entire, in others highly angulated. The metamorphoses of the genus are most interesting, the larva and pupa being highly abnormal. It is strictly confined to the Indo-Malayan region and to China and Japan.

Genus 125.—AMBLYPODIA, Horsfield. (PLATE XXVII).

Amblypodia, Horsfield, Cat. Lep. E. I. C., p. 98 (1829); id., Moore, Lep. Cey., vol. i, p. 113 (1881); id., Distant, Rhop. Malay., p. 275 (1885).

"WINGS, broad. FOREWING, arched at the base, *apex* pointed, *exterior margin* almost erect, slightly convex, *posterior* margin slightly waved; *costal nervure* extending to more than half the length of the margin; *first subcostal nervule* emitted at half, *second* subcostal at nearly half, and *third* subcostal at one-sixth before the end of the discoidal cell, third subcostal trifurcate in the male, bifurcate in the female, *fourth* subcostal thrown off at two-thirds, and *fifth* subcostal at one-half from the fourth and terminating below the apex, *sixth* subcostal (or upper radial) from the end of the cell; upper [*middle*] *disco-cellular* nervule short, bent very obliquely outwards, *lower* disco-cellular waved; *lower radial* nervule from their angle near the subcostal nervure; *discoidal cell* broad; *second median nervule* emitted at one-fifth, *first* median at two-fifths before the end of the cell; *submedian nervure* slightly waved. HINDWING, broadly oval, *costa* much arched at the base, *apex* and *exterior margin* very convex, concave hindwards and produced into a short tail, anal lobe broad; *costal nervure* arched at the base and curving to the apex; *first subcostal nervule* at nearly one-half before the end of the cell; *disco-cellular* nervule slightly concave, oblique; *radial* nervule from the middle; *discoidal cell* broad; *second median nervule* from close to the end of the cell, *first* median at nearly one-half before the end; *submedian nervure* slightly curved; *internal* nervure recurved. BODY robust, *thorax* stout; *palpi* porrect, adpressed, second joint squamose, extending one-third beyond the head, third joint short, pointed; *legs* short, thickish; *antennæ* gradually thickening to the tip. Type, *A. narada*," Horsfield. (*Moore*, l. c.)

In the forewing, the costa is evenly arched, rather strongly so at the base of the wing, the apex is acute, the outer margin slightly convex in the male, strongly convex with a slight concavity just below the apex in the female, inner margin long, slightly concave; costal nervure ends a little beyond the apex of the cell; first and second subcostal nervules with their bases very close together; third subcostal originates nearer to the apex of the wing than to the base of the upper discoidal, ending at the apex of the wing in the female; fourth subcostal present in the male only, much longer than usual, its base much nearer to the base of the third subcostal than to the apex of the wing, where it terminates; terminal portion of subcostal nervure reaching the margin below the apex; upper discoidal nervule originating from the subcostal nervure long before the apex of the cell; lower discoidal nervule given off from the upper discoidal some distance beyond the origin of the latter, its base (which apparently forms a middle disco-cellular nervule*) deflexed downwards; lower disco-cellular nervule upright, slightly concave, fully twice as long at the apparent middle disco-cellular; discoidal cell broadest in the middle; second median nervule given off some little distance before the lower end of the cell; submedian nervure at first straight, slightly bent downwards towards its apex. Hindwing considerably broader in the female than in the male, the costa and outer margin evenly and strongly arched, the submedian nervure produced into a short tail, the outer margin anterior to the tail concave, a moderate-sized anal lobe, above which the abdominal margin is excavated, but not very deeply, the abdominal margin convex; costal nervure much arched throughout and ending at the apex of the wing; first subcostal nervule arising some little distance before the apex of the cell; upper disco-cellular nervule shorter than the lower, straight, outwardly oblique; lower disco-cellular slightly concave, nearly upright; second median nervule given off close to the lower end of the cell; submedian nervure straight; internal nervure short, highly recurved. Antennæ very short, one-third the length of the costa of the forewing. Eyes naked. Male with no secondary sexual characters.

The arrangement of the discoidal nervules of the forewing is very similar to that obtaining in the next genus (*Iraota*, Moore) but in this genus the lower disco-cellular nervule is given off from the lower discoidal some distance beyond its base, while in *Iraota* these two veins have apparently a common origin. This remarkable arrangement of the discoidal nervules is confined, as far as I know, to this genus and to *Iraota*.

Mr. Doherty describes the egg of *A. narada*, Horsfield, as "large, coarse, overlaid with white, roughly tubercular, and indented with spaces obscurely hexagonal. It greatly resembles that of most of the *Theclinæ*."

LARVA of the usual lycænid shape, onisciform, with head small, second segment much larger, the segments gradually increasing in width to about the seventh, then decreasing to the anal segment, which is bluntly pointed; the constrictions between the segments fairly well-marked; a few short bristly hairs on the sides of the body. PUPA unusually lengthened and attenuated; with head rounded, thorax humped in the middle, abdominal segments very slender, the tail sharply pointed. Described from Dr. Horsfield's figures of the type species.

Seven species of this genus have been described from the region comprised in this work. Of these species, *A. narada*, Horsfield, *A. naradoides*, Moore, and *A. darana*, Moore, both sexes have been described. Of two species, *A. anita*, Hewitson, and *A. andersonii*, Moore, the males only have been described. Of two species, *A. taooana*, Moore, and *A. arracana*, Grose Smith, the sex of the specimens described is not stated. The males of these seven species can be divided into two groups; in the first, they are blue (cyaneous Horsfield; brilliant blue and ultramarine-blue, Moore) on the upperside; in the second, they are purple. The females can be divided into three groups, the first group contains *A. narada* and *A. naradoides*, in these the females are said to be blue; the second group contains a single

* My reason for refusing to call the basal portion of the lower discoidal nervule a middle disco-cellular nervule is that it is obviously as thick as the rest of the nervule, were it a true disco-cellular it would be a very fine vein, and in this respect similar to the lower disco-cellular.

species which is entirely brown on the upperside, the *A. darana* of Moore; the third group, the female of which has not hitherto been described, contains *A. anita*, and is purple. As the typical male specimen of *A. andersonii* is the only properly authenticated example I have seen, and the descriptions of nearly all the species are so obviously insufficient, I propose to keep all the species that have been described distinct, adding a few notes of my own to each. At the same time, I must record my opinion that there are probably only two distinct species in the Indian region, *A. narada* and *A. anita*, and that even they would be better described as local races than distinct species, as they have been distinguished merely by a slight difference in colour. The undersides of all the species are probably very variable, in over fifty specimens before me as I am writing, no two are exactly alike. They bear almost as strong a protective resemblance to dead leaves as do the species of the genus *Kallima*, Westwood, of the subfamily *Nymphalinæ*, and are furnished, as in those butterflies, with a dark line across the middle of the wings to represent the mid-rib of a leaf, the rest of the surface being very variously mottled and spotted. The head-quarters of the genus appear to be in the dry country of Chota Nagpur and the surrounding regions; where the rainfall is heavy, they are much scarcer. They occur almost throughout peninsular and continental India (except in the desert tracts, the Punjab, and the North-Western Provinces), and they are found in Assam, Burma, the Malay Peninsula, Java, Luzon, in the Andaman Isles (but not in the Nicobar group), and in Ceylon. In the following key I give the recorded locality for each species only.

Key to the Indian species of Amblypodia.

A. Males, upperside, both wings blue.

768. A. NARADA, Burma, Malay Peninsula, Java.
769. A. TAOOANA, Burma.
770. A. ANDERSONII, Burma.

B. Males, upperside, both wings purple.

771. A. ANITA, Sikkim, Madras, Siam.
772. A. NARADOIDES, Ceylon.
773. A. DARANA, Ceylon.
774. A. ARRACANA, Arracan Hills.

768. Amblypodia narada, Horsfield.

A. narada, Horsfield, Cat. Lep. E. I. Co., p. 98, n. 30; *Thecla narada*, l. c., pl. i, fig. 8, *male*; pl. iv, figs. 4, *larva*; 4*a*, *pupa* (1829); id., Horsfield and Moore, Cat. Lep. Mus. E.I.C., vol. i, p. 39, n. 51, pl. i, figs. 4, *larva*; 4*a*, *pupa* (1857); id., Distant, Rhop. Malay., p. 276, n. 1, pl. xxi, fig. 23, *male* (1885).

HABITAT: Mergui (*Doherty*); Penang, Malacca (*Distant*); Java (*Horsfield*).

EXPANSE: ♂, 1·6 to 2·0 inches.

DESCRIPTION: "MALE. UPPERSIDE, *both wings* blackish-brown, with a cyaneous patch, corresponding in outline with the wings, and covering the whole surface from the base to a regularly-defined distance from the anterior and posterior margins, the tint varying in brilliancy according to the direction of the light. UNDERSIDE, *both wings* brown; a brown band, commencing at the outer apical angle of the forewing passes obliquely through both wings to the anal region of the hindwing, where it forms a gradual curve, and terminates at the middle of the inner margin, having the outer edge regularly defined and of a deeper tint, the inner gradually evanescent; the whole surface of the wing, from the band to the base, is speckled or irregularly mottled with blackish-brown, and on both wings a very obscure stigma is scarcely perceptible; between this band and the posterior margin is a double series of obscure dotted lunules facing each other with their concavities, which in the hindwing is more distinct, with gradually diverging lunules; the margins between the nervules, the inner series of lunules, the anal appendage at its inner edge, and the tail are clouded with whitish dots. FEMALE. UPPERSIDE, *both wings* with the ground-colour paler than in the male, the blue patch has a light azure tint with a purple reflexion, is less widely diffused, especially in the hindwing, and the borders are proportionally broad. UNDERSIDE, *both wings* gray with a glaucous reflexion,

the markings, although of the same character, are less prominent than in the male. BODY blackish above, and brown or gray underneath. *Antennæ* almost uniformly brown to the tip, which is ferruginous." (*Horsfield*, l. c.)

LARVA pale green, with a dark (probably pulsating) dorsal line, on either side of which the body is narrowly whitish; the head black, the second segment and the three anal segments marked with black. PUPA pale green, shaded with darker green. Described from Dr. Horsfield's figures.

Mr. Doherty records *A. narada* from Mergui, thus bringing it into the Indian region, while Mr. Distant records it from the Malay Peninsula. Mr. Doherty remarks that "The Mergui form (*A. andersonii*, Moore) of *A. narada* seems identical with that found in the Malay Peninsula. It is of a brighter and richer blue than the North Indian variety." *A. narada* is probably inseparable from *A. taooana*, Moore, and *A. andersonii*, Moore, and not improbably the *A. arracana* of Grose Smith should be ranked as another synonym, though I have placed it in the purple group, as it it described as of that colour, but, as the typical specimen may be a female, and as purple specimens of this sex sometimes occur in the blue group, the species may really belong to the blue group. *A. narada* appears to be a rare species in India.

769. **Amblypodia tacoana**, Moore.

A. taooana, Moore, Proc. Zool. Soc. Lond., 1878, p. 835.

HABITAT: Taoo, 3,500 feet, Upper Tenasserim.

EXPANSE: 2·0 inches.

DESCRIPTION: "Differs from *A. narada*, Horsfield, and *A. anita*, Hewitson, in its larger size, the UPPERSIDE being of a very brilliant blue colour as in *Arhopala silhetensis*, Hewitson, and the outer black marginal band twice the width of that of those species. UNDERSIDE, *both wings* purplish-ochreous, the transverse black-speckled band and basal speckled markings prominent, the band on the *forewing* being much curved, the outer markings also prominent." (*Moore*, l. c.)

Mr. Moore did not state the sex of the specimen he was describing, but I have little doubt that it was a female, which would account for the breadth of the outer black marginal band of the upperside. I have not seen any specimen of the species.

770. **Amblypodia andersonii**, Moore.

A. andersonii, Moore, Journ. A. S. B., vol. liii, pt. 2, p. 43 (1884); idem, id., Journ. Linn. Soc. Lond., Zoology, vol. xxi, p. 44, pl. iv, fig. 4, *male* (1886).

HABITAT: Sampu, Sullivan Island, Mergui Archipelago (January).

EXPANSE: ♂, 1·75 inches.

DESCRIPTION: "MALE. Smaller than *A. taooana*, Moore. UPPERSIDE, *both wings* of a similar tint of ultramarine-blue, with a much narrower black marginal border. UNDERSIDE, *both wings* much darker-coloured, but similarly marked." (*Moore*, l. c.)

The type and only known specimen of this species is preserved in the Indian Museum, Calcutta. The blue coloration of the upperside is very rich and beautiful, and at once distinguishes it from every other specimen of the genus I have ever seen, except one of the true *A. narada*, Horsfield, in my collection from the Malay Peninsula, with which it entirely agrees. The expanse of the typical specimen, obtained by measuring from the apex of the wing to the middle of the thorax and then doubling the result (which is, I consider, the only correct way to take the expanse of Lepidopterous insects), is exactly two inches. Mr. Moore gives two inches as the expanse of his *A. taooana*, but measured in the above manner it is probably greater.

771. **Amblypodia anita**, Hewitson. (PLATE XXVII, FIG. 191 ♀).

Amblypodia anita, Hewitson, Cat. *Lycænidæ* B. M., p. 14, n. 66, pl. viii, figs. 90, 91, *male* (1862); id., Butler, Proc. Zool. Soc. Lond., 1883, p. 147, n. 8; id., Elwes, Trans. Ent. Soc. Lond., 1888, p. 403, n. 336; *A. narada*, var. *erichsonii*, Wood-Mason and de Nicéville, Journ. A. S. B., vol. xlix, pt. 2, p. 234, n. 53 (1880); idem, id., l. c., vol. l, pt. 2, p. 250, n. 74 (1881).

HABITAT: Siam (*Hewitson*), Madras (*Butler*), Sikkim (*Elwes*).

EXPANSE: ♂, 1·8 inches.

DESCRIPTION: "MALE. UPPERSIDE, *both wings* purple, the margins rather broadly brown. UNDERSIDE, *both wings* rufous, the base clouded irregularly with black, crossed near the costal margins by two indistinct macular bands of brown. *Forewing* with the apex marked with gray. *Hindwing* with the anal angle marked with gray."

"The males of *A. narada*, Horsfield, and *A. anita*, Hewitson, have a fourth branch from the subcostal nervure; the females, like the rest of the genus [as understood by Hewitson], are without it." (*Hewitson*, l. c.)

In my opinion *A. anita* should be the name by which the commonest species of the genus that occurs nearly all over India, Ceylon, the Andamans, Assam, and some parts of Burma should be known, and that, in South India and Ceylon, has a dimorphic form of female (*A. darana*, Moore). In the Andamans, the females are always more blue than purple on the upperside. I possess a single specimen from the Nilgiris and another from the Chittagong Hill Tracts, which also exhibit this type of coloration. This species occurs most abundantly in the dry district of Beerbhoom, also at Bholahât, Malda, and in the Ranchi district, where Mr. W. H. Irvine has obtained many specimens. It occurs very rarely in Calcutta, but is common in Orissa. Colonel Swinhoe possesses specimens from Karwar in Bombay, and from Madras; I possess specimens from Ganjam and the Nilgiris; it is common in Ceylon; Mr. S. E. Peal has obtained a female at Sibsagar in Upper Assam; it is found also in Burma at Shwayghan and Thyetmyo.

The figure shows both sides of a female specimen from the Andaman Isles in my collection.

772. Amblypodia naradoides, Moore.

A. naradoides, Moore, Proc. Zool. Soc. Lond., 1879, p. 141; idem, id., Lep. Cey., vol. i, p. 114, pl. xliii, figs. 1, 1*a*, *female* (1881).

HABITAT: Ceylon.

EXPANSE: ♂, 1·5; ♀, 1·87 (2·2 *Moore's figure*) inches.

DESCRIPTION: "MALE. UPPERSIDE, *both wings* dark violet purple-brown, with a broad dusky-black marginal band; anal lobe and tail chestnut-brown, the angle white-speckled. UNDERSIDE, *both wings* dark purple-brown; transverse band, speckled marks on basal area, and a submarginal series of speckled spots black, the latter and the anal angle white-speckled. FEMALE. UPPERSIDE, *both wings* dark brown. *Forewing* with the lower basal and discal areas smalt-blue. UNDERSIDE, *both wings* pale brownish-gray, transverse line and speckled markings black; anal angle ferruginous."

"A much darker insect than the Javan species *A. narada*, Horsfield." (*Moore*, l. c. in Proc. Soc. Zool. Lond.)

In Ceylon this species is recorded from the "Western Province. Plains, in forest land, chiefly during S.-W. monsoon, from May to October. Flight like *A.* [=*Arhopala*] *amantes*, Hewitson. Generally rests on leaves, sometimes, but rarely, on the ground" (*Hutchison*). "Kandy. Rather scarce" (*Wade*).

I have nothing to say with regard to this species, except that the male is indistinguishable from the common form which occurs throughout India, and the female is said to be smalt-blue on the upperside, which is the colour of specimens I possess from the Nilgiri Hills, Chittagong Hill Tracts, and Andaman Isles.

773. Amblypodia darana, Moore.

A. darana, Moore, Proc. Zool. Soc. Lond., 1879, p. 141; idem, id., Lep. Cey., vol. i, p. 114, pl. xliii, fig. 2, *female* (1881).

HABITAT: Ceylon.

EXPANSE: ♂, 1·90; ♀, 2·12 inches.

DESCRIPTION: "Differs from *A. naradoides*, Moore, in being larger, the UPPERSIDE of the MALE of a deeper violet-blue, the marginal band narrower; anal lobe red only in the middle, its margin and the tail black. UNDERSIDE, *both wings* purple chestnut-brown;

speckled markings black, the marginal series white-speckled. FEMALE. UPPERSIDE, *both wings* pale violet-brown. UNDERSIDE, *both wings* similar to the male." (*Moore*, l. c. in Proc. Zool. Soc. Lond.)

Occurs in Ceylon in the "Kottawah Forest, near Galle. Rare" (*Wade*).

In Mr. Moore's plate of this species and of *A. naradoides* in his "Lep. Cey." the numbering of the figures appears to have been reversed, nos. 1, 1*a* referring to *A. naradoides*, and no. 2 to *A. darana.*

I possess a considerable series of male *Amblypodias* from Ceylon, but do not find the differences in them that Mr. Moore defines between *naradoides* and *darana*. I have only seen one female from Ceylon, which is of the *darana* form. Colonel Swinhoe possesses a female from Madras, and I one from the Nilgiris, which are also *darana*. I believe *A. darana* to be a dimorphic female form only of the widely-distributed *A. anita*, Hewitson; which form may possibly be confined to South India and Ceylon.

774. **Amblypodia arracana,** Grose Smith.

Amblypodia arracana, Grose Smith, Ann. and Mag. of Nat. Hist., fifth series, vol. xx, p. 268 (1887).

HABITAT: Arracan Hills.

EXPANSE: 2·0 inches.

DESCRIPTION: "UPPERSIDE, *both wings* purple, exterior margins broadly dark brown. *Hindwing* with a large reddish-brown lobe at the anal angle. UNDERSIDE, *both wings* rufous, crossed from near the apex of the forewing to the middle of the inner margin of the hindwing by a brown-black line, between which and the base the space is more or less densely irrorated with the same colour. Half-way between the line and the outer margins is a brown-black band of minute maculæ, and another on the lower part of the outer margin of the *hindwing*."

"Near to *A. anata* [? *A. anita*, Hewitson, from Siam], but a larger and brighter insect." (*Grose Smith*, l. c.)

There is absolutely nothing in the above description to enable any one to identify the species; and not even the sex of the specimen described is stated.

Genus 126.—IRAOTA, Moore. (PLATE XXVII).

Iraota, Moore, Lep Cey., vol. i, p. 101 (1881); id., Distant, Rhop. Malay., p. 258 (1885).

FOREWING, triangular; *exterior margin* slightly oblique and convex below the apex; *discoidal cell* somewhat fusiform, extending to more than half the wing; *costal* nervure curved, *first subcostal nervule* emitted at more than half before the end of the cell; *second* subcostal at one-third, and *third* subcostal at one-fifth before the end of the cell, third subcostal trifid [in the male only], *fourth* subcostal at more than one-half from below the third, *fifth* subcostal at one-half from below the fourth and terminating below the apex; *disco-cellular* nervules bent inwards close to the subcostal nervure; *upper radial* nervule from the subcostal end of the cell, *lower* radial from the angle close to the subcostal nervure; *second median* nervule at one-fifth, *first* median at one-third before the end of the cell; *submedian nervure* nearly straight. MALE with a tuft of hair on the underside of the posterior margin. HINDWING, short, produced and lobed at the anal angle; a slender *tail* from the end of the submedian nervure in the male, and a second tail from the end of the first median nervule in the female; *exterior margin* slightly sinuous; *costal nervure* much arched at the base; *first subcostal nervule* at nearly one-half before the end of the cell; *disco-cellular* nervules concave, acutely angled in the middle; *radial* nervule from their angle; *third median* nervule from close to the end of the cell, *first* median at nearly one-half before the end; *submedian nervure* straight; *internal* nervure recurved. MALE with a slightly indicated glandular space between the bases of the costal and subcostal nervures. BODY robust. *Palpi* porrect, second joint squamose, projecting slightly beyond the head, third joint slender. *Legs* squamose, femora slightly pilose beneath. *Antennæ* gradually thickened to tip." (*Moore*, l. c.)

In the forewing the costa is bent at the base, a little excised in the middle, for the rest straight ; the apex is rounded ; the outer margin is at first convex, then concave ; the inner angle obliquely cut off inwardly ; the inner margin straight ; costal nervure ending opposite the apex of the discoidal cell ; first subcostal nervule bent upwards near its base towards the costal nervure, which it does not quite touch ; second subcostal with its base midway between the bases of the first subcostal and upper discoidal nervules ; third subcostal long, originating from the subcostal nervure nearer to the apex of the wing than to the base of the upper discoidal ; fourth subcostal (present in the male only) short, originating close to the apex of the wing ; the terminal portion of the subcostal nervure reaching the margin below the apex of the wing in the male, at the apex in the female ; lower discoidal nervule given off from the upper discoidal some little distance from the origin of the latter ; discoidal cell broadest in the middle ; no upper or middle disco-cellular nervules ; lower disco-cellular originating from the lower discoidal immediately after its origin, upright, slightly concave ; second median nervule originating a little before the lower end of the cell ; submedian nervure straight. Hindwing with the costa evenly curved ; the outer margin in the male straight, inwardly oblique : in the female the wing is broader and the outer margin is evenly rounded throughout, it is slightly scalloped in the male, more prominently so in the female ; a large anal lobe ; a somewhat short tail from the termination of the submedian nervure, which is often twice as long in the female as it is in the male, sometimes with a second longer tail at the termination of the first median nervule in the male ; the female has always a second tail at the termination of the first median nervule, about half as long as the inner tail, and sometimes a third tail (the shortest of all) at the termination of the second median nervule ; the costal nervure is much arched at base, curved throughout its length ; the first subcostal nervule is also curved, given off rather close to the apex of the cell ; the upper disco-cellular is slightly concave, outwardly oblique ; the lower disco-cellular is also concave but less outwardly oblique than the upper ; the second median nervule is given off very near to the lower end of the cell ; the submedian nervure is slightly recurved, the internal nervure is long and highly recurved. The antennæ are more than half as long as the costa of the forewing. The eyes are naked. The male has a very small tuft of black hairs attached to the underside of the inner margin of the forewing just before the middle ; the glandular space in the hindwing described by Mr. Moore is quite rudimentary.

Iraota and the preceding genus (*Amblypodia*, Horsfield) are structurally the most aberrant of the Indian *Lycænidæ*. Messrs. Moore and Distant appear to have both overlooked the fact of the absence of the fourth subcostal nervule in the forewing in the female, Mr. Moore describes disco-cellular nervule *s*, while only one such vein is present, and Mr. Distant says nothing about the almost unique fact of the lower discoidal nervule originating from the upper discoidal.

Larva, onisciform, smooth, the segments hardly constricted, head small, second segment small, the following segments rapidly increasing in width to the fifth, then gradually decreasing in width to the eleventh, then rapidly to the thirteenth. Pupa smooth, humped on the thorax, the abdominal segments anteriorly very broad, but very rapidly decreasing in width to the tail, which is acute.

Three species of *Iraota* occur within strict Indian limits, while two others have been recorded from the Malay Peninsula. The genus is of rather small extent, and occurs almost throughout India except the higher Himalayas and the desert tracts, in Ceylon, but not in the Andaman and Nicobar Isles, in Burma and the Malay Peninsula, in Java, Borneo, the Philippine Isles, and China. All the males have the disc and base of the wings most brilliant metallic blue on the upperside, the females are usually much duller, with a smaller patch of purple on the forewing ; usually no patch or only a very small one on the hindwing, sometimes with no purple coloration at all on the upperside. The underside of both sexes is highly variegated, castaneous with prominent silvery markings. I have only taken the butterflies

on or near the Banian tree, on the leaves and small branches of which they alight. They have a very powerful and rapid flight, but soon settle after being disturbed.

Key to the Indian species of Iraota.

A. Male with one tail, female with two.
  a. Hindwing, underside, with a large silvery irregular band below the costa at right angles to the body.
    775. I. TIMOLEON, India, China.
  b. Hindwing, underside with no large silvery band below the costa.
    776. I. MÆCENAS, India, Ceylon, China.
B. Male with two tails, female with three.
    777. I. ROCHANA, Burma, Java.

775. **Iraota timoleon**, Stoll. (PLATE XXVII, FIGS. 192 ♂, 193 ♀).

Papilio timoleon, Stoll, Suppl. Cramer, Pap. Ex., vol. v, pl. xxxii, figs. 4, 4D, *female* (1790); *Amblypodia timoleon*, Horsfield and Moore, Cat. Lep. Mus. E. I. C., vol. 1, p. 44, n. 67, pl. xii, figs. 3, *larva*; 3*a*, *pupa* (1857); id., Marshall and de Nicéville, Butt. of India, vol. 1, pl. ii, *larva* and *pupa* (1882); *Iraota timoleon*, Moore, Proc. Zool. Soc. Lond., 1882, p. 249; id., Staudinger, Ex. Schmett., p. 279, pl. xcvi, *male* (1888); *Thecla nila*, Kollar, Hügel's Kaschmir, vol. iv, pt. 2, p. 413, n. 3, pl. iv, figs. 5, 6, *male* (1844).

HABITAT: China (*Stoll*), Bhutan (*Horsfield* and *Moore*), Kangra district (*Moore*), Masuri (*Kollar*), Dalhousie, Chumba, Dagshai, Masuri, Faizabad, Julpaiguri, Sikkim (rare both in the hills and in the Terai, occurs in July), Cachar, Pachmarhi, Orissa, Ganjam, Rutnagherry, Khandala, Poona, Nilgiris (rare, found only at low elevations).

EXPANSE: ♂, 1·5 to 1·8; ♀, 1·5 to 1·9 inches.

DESCRIPTION: MALE. UPPERSIDE, *both wings* black, the lower basal area of the forewing and the disc of the hindwing rich deep metallic blue varying in extent in both wings. UNDERSIDE, *both wings* castaneous. *Forewing* with the following silvery markings:—a club-shaped mark in the cell touching the subcostal nervure and reaching to a little beyond the middle of the cell from the base; a large rounded spot on the disco-cellular nervule, a discal series of four spots in pairs arranged in a straight line, divided by a streak which reaches the margin; a broad band of black extends across the middle of the wing from the base to almost the outer margin; the inner margin pale. *Hindwing* with a very prominent broad silvery streak with irregular margins from the base of the wing (where it is narrow) to about the middle of the wing, placed below the costal nervure and at right angles to the body; a prominent well-separated silvery spot below the streak placed on the upper disco-cellular nervule, the rest of the wing more or less irrorated and marked with white streaks, an obscure submarginal broad yellowish band, the anal lobe black. FEMALE. UPPERSIDE, *both wings* purplish-brown. *Forewing* with a lower discal patch of shining but non-metallic purple variable in size. *Hindwing* sometimes with a small irrorated patch of purple scales in the middle of the disc. In four specimens from Poona and Khandalla in Colonel Swinhoe's collection both wings on the upperside are as brilliantly metallic blue as in the male, and the colour is as extensive in the hindwing, and even more extensive in the forewing than in the opposite sex. UNDERSIDE, *both wings* similar to the male, but all the markings more prominent.

LARVA onisciform, smooth; ·9 of an inch in length; head very small; second segment rather large, third and fourth progressively larger, then gradually decreasing in width to the anal segment; constrictions between the segments very shallow; head pinkish, dorsal area pale pink shading off laterally into pale greenish, the anal segment entirely pale greenish; three series of annular dots on each side, no prominent markings whatever. PUPA very short and thick, dark brown, streaked with darker brown; head-case well marked; the abdomen very slightly constricted behind the thorax, posteriorly much rounded. Described from Horsfield and Moore's figures.

I. timoleon has almost precisely the same general range as *I. mæcenas*, Fabricius. Both occur in China and in many parts of India, but this species does not occur in Ceylon as does *I. mæcenas*. It presents the same apparent dimorphism in the female as that species,

Though these two species are apparently so distinct, I hold to the opinion that breeding will probably prove them to be but one variable species. The same opinion is held by Mr. W. Doherty, who writes of *I. mæcenas*, "an extremely variable species wherever I have found it." I think it by no means improbable that this variability is due to seasonal causes, and that it will hereafter be found that *I. timoleon* is the rains form and *I. mæcenas* the dry-season form of one species.

Figure 192 shews both sides of a male specimen from Chumba in the Western Himalayas, and figure 193 shews both sides of a female example from Jalpaiguri in the Western Dooars, both in my collection.

776. **Iraota mæcenas,** Fabricius.

Hesperia mæcenas, Fabricius, Ent. Syst., vol. iii, pt. 1, p. 271, n. 45 (1793) ; id., Donovan, Ins. China, pl. xxxix, fig. 2, *male* (1798) ; *Deudorix mæcenas*, Hewitson, Ill. Diurn. Lep., p. 25, n. 27 (1863) ; id., Butler, Cat. Fab. Lep. B. M., p. 180, n. 2 (1861) ; *Iraota mæcenas*, Moore, Lep. Cey., vol. 1, p. 102, pl. xl, figs. 2, *male* ; 2a, *female* ; 2b, *larvæ* and *pupa* (1881) ; id., Doherty, Journ. A. S. B., vol. lv, pt. 2, p. 126, n. 123 (1886) ; *Deudorix timoleon*, var., Hewitson, Ill. Diurn. Lep., pl. viii, fig. 21, *female* (1863).

HABITAT : China (*Fabricius* and *Drury*) ; Hong-Kong (*Butler*) ; North India (*Hewitson*) ; Ceylon (*Moore*) ; Jhulaghât, eastern border of Kumaon (*Doherty*) ; Tanna or Nasik district, Egutpura, on the Thul Ghât, October ; Bombay, October (*Aitken*) ; Bhutan ; Sikkim, April, November and December (*Möller*) ; Mundi, Masuri, Dinapore, Bholahât, Calcutta, Orissa, Bangalore.

EXPANSE : ♂, 1·5 to 1·7 ; ♀, 1·6 to 1·9 inches.

DESCRIPTION : "MALE and FEMALE. UPPERSIDE, *both wings* violet-black, lower discal areas deep metallic-blue. UNDERSIDE, *both wings* dark chestnut-brown. *Forewing* with a white discoidal streak, a large disco-cellular spot, some transverse discal speckled spots, and lower submarginal lunular spots, posterior border also white. *Hindwing* with a basal slender white-speckled curved line, some sinuous lines below the cell, an indistinct discal and a submarginal lunular line, and slender marginal line, the discal and anal areas also minutely white-speckled ; anal lobe and spot beyond black."

"LARVA onisciform, dorsally thickened, sloping obliquely at each end ; pale green, with rows of small circular spots and longitudinally intervening pale pink bands. Feeds on *Ficus religiosa*. PUPA short, very broad laterally ; purple-brown, with darker dorsal bands and segmental spots." (*Moore*, l. c.)

"The variety of the plate was drawn from a belief that there was only one species ; since then, I am inclined to think that there are two. First, the *I. timoleon* of Stoll (a wretched figure), the insect figured by Dr. Boisduval, and the *I. rochana* of Horsfield and Moore, which agree in having the hindwing broad at the anal angle, with two slender tails ; and secondly, distinct from them, the figure in Donovan's insects of China, the *Thecla nila* of Kollar, and the figure of the plate, which have the hindwing much more pointed at the anal angle and with one broad tail. The white spots on the underside of the hindwing of *I. mæcenas* are much less distinctly defined, the large white spot near the base is shorter, the double zig-zag white lines which cross the wing in *I. timoleon* (converging into one) are scarcely seen in *I. mæcenas*, and the slender white line which in *I. timoleon* connects the basal spot and the transverse lines is in *I. mæcenas* represented by a round spot." (*Hewitson*, l. c.)

With reference to the above remarks of Hewitson's, I consider that the *timoleon* of Stoll (a female), is distinct from the insect figured under that name by Boisduval (a female), the latter being the *rochana* of Horsfield (Moore figures the male). Mr. Hewitson does not seem to have appreciated the fact that the broad anal angle to the hindwing with two tails (sometimes three) are characters usually distinctive of the female, and that one tail (sometimes two) and a narrow hindwing denote a male. Again, I disagree with Mr. Hewitson in considering the *mæcenas* of Donovan (a male) and the *nila* of Kollar (a male) the same : they represent distinct species.

As I identify this species, there is no difficulty in distinguishing it ; on the underside of the hindwing in both sexes the prominent broad silvery subcostal streak at right angles to the body present in *I. timoleon*, Stoll, is absent, though usually its outline can be distinctly

traced. It will be observed that Mr. Moore describes the colouring of both sexes on the upperside as the same. As far as my experience goes, this is not usually the case. I possess a single female only from Bangalore which has the rich metallic blue so characteristic of the male. All the numerous specimens I possess of that sex from other localities have the upperside shining (but not metallic) purple, and, instead of the hindwing being almost entirely of that colour, as in the Bangalore female, there is a small and obscure irrorated patch on the disc only. As this diversity in coloration occurs also in *I. timoleon*, I assume that the females of at any rate two species in this genus are dimorphic ; if this were not the case it would be necessary to describe two new species to which I should be unable to assign corresponding males.

I have given above every locality that I can ascertain for this species. It will be observed that it occurs with *I. timoleon* in China, the Western Himalayas, Oudh, in Sikkim, Orissa, and Bombay. It occurs alone in Ceylon, Bangalore, Calcutta, and Bholahât. These localities are not numerous, and I shall expect to find hereafter that in them *I. timoleon* is found. The only specimen of an *Iraota* I possess from Ceylon is exactly intermediate between *timoleon* and *mæcenas*, and goes far to confirm my opinion that these two supposed distinct species are in reality but one variable species.

I append as a foot-note a description of *Iraota* [*Iroata*] *nila*, Distant.* If it is an *Iraota* at all, which I very much doubt, it belongs to this group, as it has two tails only to the hindwing, while the females of the other group have three tails. The name *nila* has already been used by Kollar for a butterfly of this genus.

777. Iraota rochana, Horsfield.

Amblypodia rochana, Horsfield, Cat. Lep. E. I. C., p. 108, n. 40 (1829); id., Horsfield and Moore, Cat. Lep. Mus. E. I. C., vol. i, p. 44, n. 68, pl. *1a*, fig. 10, *male* (1857); *Iraota rochana*, Moore, Journ. Linn. Soc. Lond., Zoology, vol. xxi, p. 43 (1886); *Thecla timoleon*, Boisduval (*nec* Stoll), Sp. Gén., vol. i, pl. xxii, fig. 4, *female* (1836).

HABITAT : Mergui, Java.

EXPANSE : ♂, 1·41 ; ♀, 1·60 to 1·80 inches.

DESCRIPTION : " MALE. UPPERSIDE, *both wings* black. *Forewing* with an oblong patch of deep cyaneous-blue, or reflecting in a different light a beautiful sea-green lustre. *Hindwing* with a similar large area nearly circumscribed according to the outline of the wing, deeply notched at the base and separated by a narrow curved border from the posterior margin. UNDERSIDE, *both wings* dark reddish-brown, the hindwing covered with a shining bay reflexion ; the anal area paler and clouded, in the forewing uniformly gray, and defined in the form of a regular arch in the hindwing ; the surface of both wings bearing diversified marks of a beautiful shining silvery white, arranged in the following manner :—*Forewing* with a narrow white line, attenuated towards the base, extends near the inner boundary of the costal area about one-third of the wing ; on the disc stands a very short transverse stigma ; behind this follows a curved interrupted band of five wedge-shaped dots, of which the intermediate one is

* *Iraota nila*, Distant, Rhop. Malay., p. 462, n. 2, pl. xliv, fig. 24, *female* (1886). HABITAT : Malacca.
EXPANSE : *Female*, 1·5 inches. DESCRIPTION : " FEMALE. UPPERSIDE, *both wings* violaceous-blue ; costal
and outer margins of the *forewing*, and costal, outer and abdominal margins of the *hindwing* more or less
brownish. UNDERSIDE, *forewing* pale ochraceous-brown, the area near the posterior angle greyish, the area
beyond the discoidal cell more or less castaneous, preceded by a narrow white linear fascia extending from
the first subcostal to the first median nervule ; this fascia is followed by a series of five white spots, and these by
a cluster of four apical spots of the same colour ; two dark spots are placed beyond the lower two of the
five white spots. *Hindwing* with about the upper half castaneous, the remaining area more or less ochraceous,
shaded with castaneous, and marked with a series of white spots, most of which are shaded or margined with
dark bluish ; these spots are thus situated :—two subcostal, four (small) subapical, four discal, four (large, and
much margined with bluish) on abdominal margin, and a marginal series of lineate spots ; a black spot at anal
angle, and a smaller black spot between the first and second median nervules. *Body* above more or less conco-
lorous with the wings, beneath greyish. *Legs* greyish, mottled and streaked with brownish." (*Distant*, l. c.)
This species may be an *Iraota*, but I very much doubt it. As figured, the antennæ are much more than half
as long as the costa of the forewing ; the lower discoidal nervule is shewn as arising at the point of junction
of equal middle and lower disco-cellular nervules in the forewing, a structural arrangement which is totally
different from that seen in *Iraota*, in which no middle disco-cellular nervule exists ; the inner tail is shorter
than the outer, the reverse of this being the case in *Iraota* ; and lastly the whole coloration and markings
of the insect appear to me abnormal. It should probably form the type of a new genus.

greatly lengthened and sagittiform, and, near the posterior margin, a gently curved striga of minute arcs. *Hindwing* has a delicate dash at the inner costal curve, then a very large oblong longitudinally-disposed spot with irregularly-defined edges, narrow at its basal extremity, enlarged into a rounded head as it approaches the middle of the costal margin, the exterior edge being deeply sinuated and the interior produced into a lengthened process stretching at right angles to the disc; behind this an irregular striga extending in an arch across the entire surface at the interior boundary of the gray anal area, commencing near the middle of the costa with a large irregular dot, continued over the disc by four or five wedge-shaped marks, and then passing in two slightly diverging acutely flexuose lines to the inner margin; lastly near the hinder margin a double striga, the interior one undulated, enclosing a few oblong reddish-brown marks terminating near the external tail, all of a shining white tint, being succeeded by a large oblong transverse patch of a deep black colour and a stripe closely dotted with white, both which are regularly parallel with the posterior margin, while the anal appendage itself is covered by a large circular black spot, and two marks of the same colour, edged with white, are disposed along the oblique portion of the inner margin. *Body* brown above and hoary underneath. *Antennæ* uniformly brown to a short ferruginous tip. *Tails* black with a delicate medial line and a white extremity." (*Horsfield*, l. c.) FEMALE. UPPERSIDE, *both wings* dull purplish-black, unmarked. UNDERSIDE, *both wings* as in the male, except that the large silvery band on the hindwing is completely joined to the spot beyond, while in the male the two are well separated. The female has three tails to the hindwing, while the male has but two.

My knowledge of this species is confined to a single female collected by Dr. J. Anderson in March on Elphinstone Island in the Mergui Archipelago, and now in the Indian Museum, Calcutta. I am quite unable to say how this specimen, which has been identified by Mr. Moore, differs from Mr. Distant's *I. boswelliana*, of which a description is given below.*

Genus 127.—Surendra, Moore. (PLATE XXVII).

Surendra, Moore, Proc. Zool. Soc. Lond., 1878, p. 835; idem, id., l. c., 1879, p. 142; idem, id., Lep. Cey., vol. 1, p. 112 (1881).

"Allied to *Thaduka*, Moore. Sexes dissimilar in colour above. FOREWING, short, broad; *costa* slightly arched, *apex* acute, *exterior margin* in the female very convex in the middle, less

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* *Iraota boswelliana*, * Distant, Rhop. Malay., p. 258, n. 1, pl. xxii, fig. 23, *female* (1885); id., Staudinger, Ex. Schmett., p. 279, pl. xcvi, *female* (1888). HABITAT: Penang, Singapore. EXPANSE: *Male*, 1·4 to 1·5; *female*, 1·8 inches. DESCRIPTION: "MALE. UPPERSIDE, *both wings* dark fuscous. *Forewing* with a large patch of dark bluisb scales occupying the base of the cell and extending along the inner half, but not reaching the outer margin. *Hindwing* with a very large and similar dark bluish patch occupying the whole discal area; *tail* and the angulation at tbe apex of tbe second median nervule dark fuscous, with tbe apex greyisb-white. UNDERSIDE, *both wings* warm brownish, shaded with purple. *Forewing* with seven white spots, situated one largest and elongate in the cell, one at the end of tbe cell, and five in a somewhat curved series between the end of the cell and the outer margin, of which the third is the largest and extends outwardly; and a submarginal, somewhat obscure, macular series of small greyish spots; towards the inner margin the ground-colour becomes much paler. *Hindwing* with the basal balf dark purplish, bounded by a medial silvery white fascia, which is widest at the abdominal margin and contains some irregular purplish markings; the basal dark purplish area also contains two silvery white fasciæ, the first short and costal, the second very large, extending from near the base of the abdominal margin to the apex, with a concave depression above and a narrow medial continuation beneath, which reaches the medial silvery fascia; beyond this tbe colour is ochraceous, with some purplish marginal spots, bordered with wbite near the apex, and a broad bluish marginal fascia bordered with white, extending from about the third median nervule to the anal angle, and containing a darker spot at either end. *Body* above and beneath more or less concolorous with the wings. *Legs* pale brownish. FEMALE. UPPERSIDE, *both wings* pale uniform ochraceous-brown. *Hindwing* with the costal area paler, *tails* and angular [? anal] prolongation darker brown, with their apices greyish. UNDERSIDE, *both wings* as in tbe male, but brighter in hue and markings."

"Although the female is decidedly larger than tbe male, it is probable, if a large series could be measured, that the diversity is not so great as the above dimensions advocate. The male also possesses a more elongate appearance than the female."

"Considerable confusion has ensued by several distinct species having for a long time been placed under one name. Thus Mr. Hewitson (Ill. Diurn. Lep., p. 25 (1869) has not only considered *I. timoleon*, Stoll, *I. rochana*, Horsfield, and *I. lazarena*, Felder, as one species, but has also included the species described here, as is evident from the mention of Penang as a locality. In this opinion he has been copied by Mr. Kirby (Cat. Diurn. Lep., p. 418 (1871). All tbese species are, however, clearly distinct and easily determinable by the emphatic markings on the underside of the wings, which, in the Rhopalocera, are the surest guide for specific difference." (*Distant*, l. c.)

* "In naming this species I have taken a hint from Dr. Johnson. The great lexicographer once remarked to his future biographer, *á propos* of a moth which fluttered into a candle, 'That creature was its own tormentor, and I believe its name was Boswell.' This is probably the whole condensed 'entomological' observation of Dr, Johnson, and as such may be remembered." (*Distant*, l. c.)

so in the male; *hind margin* nearly straight. HINDWING, short, somewhat quadrate; *anterior margin* nearly straight, *apex* angled; *exterior margin* nearly straight anteriorly, truncate posteriorly, and in male with one tail situated at the end of the first median nervule, in the female with two tails, one at the first, the other at the second median nervule, anal lobe large. *Venation* similar to *Tkaduka*, Moore. [This is incorrect, the venation differs considerably]. *Palpi* long, slender. *Legs* short. *Antennæ* uniformly thickened." (*Moore*, l. c. in Proc. Zool. Soc. Lond., 1878). "Type, *Amblypodia quercetorum*, Moore, Horsfield and Moore, Cat. Lep. Mus. E. I. C., vol. I, p. 42, n. 63, pl. 1*a*, fig. 7, *male* (1857)." (*Moore*, l. c. in Proc. Zool. Soc. Lond., 1879).

In the forewing of the typical species the costa is regularly arched, more so in the female than in the male, the apex acute, the outer margin at first concave, then strongly convex, especially so in the female, the inner margin slightly sinuous; costal nervure ending opposite the apex of the cell; second subcostal nervule with its base equi-distant between the bases of the first subcostal and upper discoidal nervules; the third subcostal nervule is short, originating nearer the apex of the wing than of the cell; disco-cellular nervules upright, concave, the middle a little shorter than the lower, given off from the upper discoidal near to its base; lower disco-cellular meets the median nervure at an equal distance from the base of the second median nervule, as does the middle disco-cellular from the base of the upper discoidal nervule; submedian nervure straight. In the hindwing the costa is much arched at base, then nearly straight to apex in the male, slightly arched in female; outer margin in male regularly convex to tail, then oblique and deeply excavated to anal lobe, in the female it is concave to the base of the outer tail; abdominal margin excavated above the anal lobe, then convex to the base of the wing; the first subcostal nervule is given off rather near to the apex of the cell; the disco-cellular nervules are almost straight, of equal length, and slightly outwardly oblique; the second median nervule is given off exactly opposite the lower end of the cell; the submedian nervure is straight, the internal nervure is at first straight then strongly bowed outwardly. The male has no secondary sexual characters, and it has a somewhat short tail at the termination of the first median nervule, the female possesses a second tail of equal length at the termination of the second median nervule. Both sexes have a very large anal lobe. The eyes are naked.

Mr. Doherty has recently added two very interesting species (*S. amisena*, Hewitson, and *S. florimel*, Doherty) from Burma to this genus. The male of *S. amisena* has a much shorter tail and a smaller lobe than in *S. quercetorum*, both the tails and the lobe of the female are also smaller. *S. florimel* is still more aberrant: neither sex possesses tails or a lobe, the hindwing being only toothed or angled at the apex of the second median nervule. Both these species are perfectly distinct and easily recognised.

Three species in addition to the type species have been described from strictly Indian limits: specimens of all of them are in my possession. The distinguishing characters which have been given by various authors to discriminate between them and the parent form, *S. quercetorum*, Moore, are, in my opinion, so slight and trivial—and, moreover, are such as would be likely to occur in a widely-distributed species such as is *S. quercetorum* occurring in great variations of climate—that I hold very strongly to the belief that they represent but one somewhat variable species, which should be known as *S. quercetorum*. The form which occurs in Sikkim and Assam averages considerably larger than examples from South India, Ceylon, Burma, and the Andaman Isles. In almost all localities the hindwing is sometimes marked on the upperside in the male with a patch of purple in the middle: this patch is, however, sometimes absent. The prominence of all the markings of the underside as well as the shade of the ground-colour is also variable. Viewed as a single variable species, *S. quercetorum* occurs almost throughout the outer ranges of the Himalayas at low elevations, in Assam, Burma, Orissa, Madras, Bombay, the Nilgiri, Shevaroy and Pulni Hills, in Trichinopoly, Ceylon, and the Andaman Isles. The following key simply gives the hitherto recorded localities for the different supposed distinct species of this group, and in the descriptions of these the habitat headings contain those localities only which have been recorded for them by various authors. *S. amesina*, Hewitson, is abundantly distinct; the male may be known by having a smaller tail and lobe than *S. quercetorum*; the

female is glossed with steely-purple on the upperside, a very abnormal feature in this genus. *S. florimel*, Doherty, is even more distinct. The male is much more richly purple-blue than the other species of the genus; the female is fuscous on the upperside as in the same sex of *S. quercetorum*; both sexes, however, have no tail or anal lobe whatever, thus entirely departing from the normal structure of the other species of the genus. The markings of the underside of both sexes of all the species of the genus *Surendra* are highly peculiar and characteristic, and by them any species can at once be recognised; they are somewhat approached, however, by *Zinaspa todara*, Moore, and *L. distorta*, de Nicéville.

Mr. Doherty notes that "*Surendra*, Moore, *Apporasa*, Moore, and a number of *Arhopalas* have hemispherical eggs covered with white globular tubercles and triangular reticulations, six of which radiate from each tubercle. Somewhat similar reticulation occurs in some *Lycæninæ*. I must apologise for a former statement* that *Surendra* must be placed in the *Theclinæ* on the strength of the egg. At that time I was acquainted only with the spiny form of egg, which is the usual one in the Indian species of this group." (Journ. A. S. B., vol. lviii, pt. 2, p. (1889).

The genus occurs in the Himalayas, Southern and Eastern India, Burma, Ceylon, the Malay Peninsula, and in the Islands of Nias and Java. The transformations of no species are known, but Mr. P. W. Mackinnon has seen the female of *S. quercetorum* laying eggs on a species of *Mimosa* in the Dehra Dun.

Key to the Indian species of Surendra.

A. Male, hindwing with one tail, female with two.
- *a*. Female, upperside, both wings dull brown, forewing with the middle of the disc paler; both sexes, tails long.
  - a[1]. Of large size.
    - 778. S. QUERCETORUM, Western Himalayas, Assam.
  - *b*[1]. Of smaller size.
    - 779. S. BIPLAGIATA, Madras.
    - 780. S. DISCALIS, Ceylon.
    - 781. S. LATIMARGO, Andaman Isles.
- *b*. Female, upperside, both wings strongly glossed with lilac-blue; both sexes, tails shorter.
    - 782. S. AMISENA, Burma, Singapore, Nias.

B. Both sexes, hindwing with no tail, with a tooth only at end of second median nervule.
- 783. S. FLORIMEL, Burma.

778. Surendra quercetorum, Moore. (PLATE XXVII, FIGS. 194 ♂, 195 ♀).

Amblypodia quercetorum, Moore, Horsfield and Moore, Cat. Lep. Mus. E. I. C., vol. i, p 42, n. 63, pl. *ia*, fig. 7, *male* (1857); id., Hewitson, Cat. *Lycænidæ* B. M., p. 14, n. 63 (1862); id., Staudinger, Ex. Schmett., p. 281, pl. xcvi, *male* and *female* (1888); *Surendra quercetorum*, Moore, Proc. Zool. Soc. Lond., 1882, p. 251; id., Doherty, Journ. A. S. B., vol. lv, pt. 2, p. 130, n. 151 (1886); *Amblypodia vivarna*, Hewitson (*nec* Horsfield), Cat. *Lycænidæ* B. M., pl. vii, fig. 76, *female* (1862).

HABITAT: Sylhet, N. India, Kangra Valley (*Moore*); Sylhet (*Hewitson*); Bagheswar, Lower Ramganga, Gori and Kali valleys, 2,000 to 4,000 feet, Kumaon (*Doherty*).

EXPANSE: ♂, 1·62; ♀, 1·55 inches (*Hewitson's figure*).

DESCRIPTION: MALE. "UPPERSIDE, *both wings* dark brown, the middle of the wings deep purple. *Forewing* with the anterior and posterior angles pointed. *Hindwing* with the anal angle elongated. UNDERSIDE, *both wings* brown. *Forewing* with a series of small dark spots near the exterior margin, then an undulating line, and towards the base some indistinct spots. *Hindwing* with a dark brown fascia running from the anterior angle across to middle of abdominal margin; an undulating dark line near the exterior margin, and two small whitish elongated spots near the anterior margin." (*Moore*, l. c. in Cat. Lep. Mus. E. I. C.) FEMALE. UPPERSIDE, *both wings* purplish smoky-brown varying in intensity of shade. *Forewing* with the disc and inner margin often paler than the rest of the wing. *Hindwing*, tails brown, sometimes tipped with white. UNDERSIDE, *both wings* as in the male. Described from Sikkim specimens.

* "The egg clearly shows that the genus [*Surendra*] is near *Thecla*, and remote from *Amblypodia*." (*Doherty*, Journ. A. S. B., vol. lv, pt. 2, p. 130, n. 151 (1886).

Mr. Hewitson describes a "Variety *a*" from Sylhet as follows :—"MALE. UPPERSIDE, *forewing* less pointed at the apex, the blue colour much lighter, the margins rufous-brown. *Hindwing* uniform rufous-brown. FEMALE. UPPERSIDE, *both wings* rufous-brown. *Forewing* with a longitudinal ferruginous spot in the middle. The female figured is very likely a variety ; it is probably for the most part of a uniform rufous-brown."

"On the underside *S. quercetorum* differs from *S. vivarna*, Horsfield, chiefly in the obscurity, or absence altogether, of the white spots which constitute the medial band of the hindwing of that species." (*Hewitson*, l. c.)

I observe the same tendency to variation in Sikkim specimens as Mr. Hewitson has noted in examples from Sylhet. The one doubtfully constant character which I can find to separate this species from those which follow is the larger size of *S. quercetorum*. In Sikkim it is a common species, occurring both in the hills and in the Terai, at any rate in April and October, but probably throughout the year. Colonel A. M. Lang took a single specimen on 10th October at Khairna, Kosi Valley, 3,100 feet, Kumaon. Its occurrence in the Kangra Valley is a little doubtful, I think, though Mr. P. W. Mackinnon has taken it in the Dehra Dun in August. It was obtained by the Yunan expedition in Upper Burma, and I possess a specimen taken by Major C. T. Bingham in Pegu in June, and another from Rangoon in July. It is a little remarkable that I have always caught many more females than males of this species in Sikkim. The markings of the underside are strongly protective, and resemble dead leaves.

Figure 194 shows both sides of a male specimen, figure 195 shows both sides of a female example, both from Sikkim, and in my collection.

Mr. Distant does not include any species of the genus *Surendra* under that name (though he gives *S. amisena* as a *Rapala*) in his "Rhopalocera Malayana," though Mr. Hewitson gives a variety of *S. vivarna*, Horsfield, from Singapore. To enable this form to be distinguished if again found, I give a full description of it as a foot-note.*

779. **Surendra biplagiata**, Butler.

S. biplagiata, Butler, Proc. Zool. Soc. Lond., 1883, p. 147, n. 9, pl. xxiv, fig. 12, *male*.

HABITAT : Madras.

EXPANSE : ♂, 1·35 inches.

DESCRIPTION : "MALE. Near to *S. discalis*, Moore, but easily distinguished by having no violet patches on the UPPERSIDE of the *hindwing*, and by the grey colouring of the UNDERSIDE, upon which the markings are extremely indistinct." (*Butler*, l. c.)

I have seldom seen a worse modern illustration of a butterfly than the one given of this species. The colouring is exaggerated, the outline is incorrect, though the figured specimen is a

* *Surendra vivarna*, Horsfield. *Amblypodia vivarna*, Horsfield, Cat. Lep. E. I. Co., p. 99, n. 31 (1829); id., Hewitson, Cat. *Lycænidæ* B. M., p. 13, n. 61, pl. vii, figs. 73, 77, *male* ; 75, *female* (1862). HABITAT : Singapore (*Hewitson*) ; Java (*Horsfield*). EXPANSE : *Male* and *female*, 1·00 to 1·33 inches. DESCRIPTION : "MALE. UPPERSIDE, *both wings* deep blackish-brown. *Forewing* with a large oblong brilliant cyaneous patch. *Hindwing* with a triangular patch of the same colour, varying in both wings according to the direction of the light to obscure purple, being separated from the margins by a regularly-defined border of the ground-colour, which is broader at the inner margin of the hindwing, where the anal angle excavation has a grayish tint. UNDERSIDE, *both wings* brown with a glaucous tint, the surface being also marked with a few clouds inclining to a purple colour ; an irregularly arched and flexuous streak, consisting of delicate lunules in close succession, passes through both wings ; in the forewing it commences at the same distance from the costa and the inner margin, and after a short curve at each extremity forms a large arch in the middle area tending towards the posterior margin ; in the hindwing it winds over the surface in a serpentine course, and the lunules are individually edged externally with pale sulphureous-yellow. *Forewing* has further two short transverse lituræ in the middle area before the disc, three obsolete marginal dots near the medial portion of the costa, and finally a row of dots parallel with the posterior margin. *Hindwing* has near the base a lunule edged with yellow, and an obsolete waving litura disposed in succession as a striga ; then, behind the curved medial striga, a series parallel with the posterior margin, commencing at the outer apical angle with four or five successive obsolete dots, followed by as many lunules edged with yellow and continued in a flexuose direction to the inner angle, and, finally, at the anal termination of the wing, three semilunar marks, faintly dotted with yellow, extending from the outer tail to the inner edge of the anal appendage. FEMALE. UPPERSIDE, *both wings* uniformly dark brown. UNDERSIDE, *both wings* as in the male. *Body* brown above and gray underneath. *Antennæ* have a brown tint to the ferruginous tip, the rings having a very faint grayish discoloration. *Tails* two, the inner one, which exceeds the other in length, is brown with a grayish tip." (*Horsfield*, l. c.)

Mr. Hewitson (l. c.) describes a "Variety *a*" of this species from Singapore as follows :—"With the forewing somewhat more pointed at the apex : the transverse band on the underside of the forewing straighter and less undulated. The anal angle of the hindwing irrorated with silvery-blue."

male, two tails are shown, the anal angle of the hindwing is rounded, and there is no anal lobe. In Colonel Swinhoe's collection are two males from Madras of that which I suppose to be this species, and which have been so named by Mr. Moore. They both possess violet patches on the upperside of the hindwing. This, however, is a character of no importance; being almost everywhere eminently variable. The underside is certainly greyer, and the markings a little less distinct than in typical specimens from Sikkim, characters which are probably due to a dry habitat.

780. **Surendra discalis,** Moore.

S. discalis, Moore, Proc. Zool. Soc. Lond., 1879, p. 142; idem, id., Lep. Cey., vol. i, p. 113, pl xliv, figs. 1, *male* 1a, *female* (1881).

HABITAT: Ceylon.

EXPANSE: ♂, ♀, 1·3 inches.

DESCRIPTION: "Differs from *S. vivarna*, Horsfield, in having a broader [black] border in the male. The wings are of the same shape as in *S. latimargo*, Moore. FEMALE. UPPERSIDE, *both wings* ochreous-brown slightly violet-tinted, with a prominent pale ochreous discal area. UNDERSIDE, *both wings* greyish basally, ochreous-brown externally, with dark sinuous markings." (*Moore*, l. c. in Proc. Zool. Soc. Lond.)

I possess a considerable series of this species from Ceylon. It is simply a small form of *S. quercetorum*; it has absolutely, as far as I can see, no other character except its small size by which it can be distinguished from that species. The ochreous patch on the upperside of the forewing in the female is very variable, in some specimens not differing at all from the pale patch seen in *S. quercetorum*. In Ceylon it occurs at "Matale. Garden hedges. August" (*Hutchison*). "Kandy and Galle. Common" (*Wade*). "Kandy and North Matale. Difficult to capture, from its habit of keeping within the protection of the thorny *Acacias*" (*Mackwood*).

781. **Surendra latimargo,** Moore.

S. latimargo, Moore, Proc. Zool. Soc. Lond., 1879, p. 142; *S. quercetorum*, var. *latimargo*, Wood-Mason and de Nicéville, Journ, A. S. B., vol. xlix, pt. 2, p. 235, n. 55 (1880).

HABITAT: Andamans.

EXPANSE: ♂, 1·2 to 1·4; ♀, 1·40 to 1·55 inches.

DESCRIPTION: "Near to *S. vivarna* (*Amblypodia vivarna*, Horsfield, Catal. Lep. E. I. C., 1829, p. 99), from Java. Differs in being smaller, with slightly shorter wings, the hindwing less convex at the anterior angle and outer margin. MALE. UPPERSIDE, *both wings* have a much broader brown outer border, and the *hindwing* has scarcely any blue on the disc. UNDERSIDE, *both wings* purplish fawn-colour, the outer transverse sinuous line darker, and the inner zigzag line with less white border. FEMALE differs also in being of a dark vinous-brown above, with a slightly paler discal area on the forewing, and of a dark fawn-colour beneath." (*Moore*, l. c.)

"Is *A. quercetorum* itself more than a local race or variety of *A.* [=*S.*] *vivarna*, Horsfield, from Java?" (*Wood-Mason* and *de Nicéville*, l. c.)

Not uncommon in the Andamans. It averages a little larger, perhaps, than the three species which precede it. I think it would be absolutely impossible for any one to separate the specimens of the four above-described Indian species of *Surendra* into their respective species if the specimens I possess of them had their labels removed and were mixed up. Even size is not sufficient to distinguish *S. quercetorum*, Moore, as I possess some specimens of that species from Sikkim, which are quite as small as any *Surendra* from South India, Ceylon, or the Andamans.

782. **Surendra amisena,** Hewitson.

Amblypodia amisena, Hewitson, Cat. *Lycænidæ* B. M., p. 13, n. 62, pl. vii, figs. 74, 78, *female* (1862); id., Kheil, Rhop. Ins. Nias, p. 33, n. 123 (1884); *Rapala amisena*, Distant, Rhop. Malay., p. 277, n. 1, pl. xxiii, fig. 13, *male* (1885); *Surendra amisena*, Doherty, Journ. A. S. B., vol. lviii, pt. 2, p. (1889).

HABITAT: Mergui, Myitta, Burma (*Doherty*); Singapore (*Hewitson* and *Distant*); Nias Island (*Kheil*).

EXPANSE: ♂, 1·4 to 1·5; ♀, 1·4 to 1·5 inches.

DESCRIPTION: "MALE. UPPERSIDE, *both wings* dark violaceous-blue. *Forewing* with the costal and outer margins (very broadly at the apex) dark fuscous. *Hindwing* with the costal and outer margins (the first broadly, particularly at apex, and the second narrowly) dark fuscous, the abdominal margin somewhat paler fuscous. UNDERSIDE, *both wings* dark brownish, the markings dark fuscous. *Forewing* with a linear spot near the middle and one at the end of the cell, a waved and sinuated linear fascia between the end of the cell and the apex of the wing, preceded by a subcostal linear spot situated between the first and second subcostal nervules, and a submarginal series of small spots placed between the nervules. *Hindwing* with a short broken linear fascia near the base, commencing at the costal nervure and terminating near the submedian nervure, a much-waved and sinuated linear fascia more or less outwardly margined with greyish crosses the wing beyond the end of the cell; a submarginal series of spots (largest above the third median nervule) placed between the nervules, and three metallic greenish marginal spots, more or less centred with black, near the anal angle. *Tail* fuscous, with the apex greyish-white. *Body* and *legs* more or less concolorous with the wings. *Antennæ* with the extreme apex ochraceous." (*Distant*, l. c.) FEMALE. "UPPERSIDE, *both wings* dull lilac-blue. *Forewing* with the margins suffused with brown. *Hindwing* rufous-brown, glossed with blue in the middle. UNDERSIDE, *forewing* with the transverse band different from that of *A.* [=*S.*] *vivarna*, Horsfield, without the angular bends of that species, and gradually curved outwards to the middle. *Hindwing* with the anal angle irrorated with dull light blue, with a lunular black spot between the tails." (*Hewitson*, l. c.)

Mr. Doherty has given the following note on the specimens of this species he obtained in Burma:—"The female agrees well with Hewitson's figure, except that the transverse discal line of the forewing on the underside is more irregular, and like that of his figure of '*Amblypodia*' *vivarna*, Horsfield. The male differs from Distant's figure in being more angulate, the forewing being acuminate and slightly falcate. The blue area on the upperside varies greatly, sometimes occupying less than a third of the forewing and a sixth of the hindwing, sometimes more than half of the forewing and a third of the hindwing. In this species the male has a short tail at the end of the first median nervule, but scarcely more than an angle at the end of the second median nervule; the anal lobe is much smaller than in *S. quercetorum*, Moore. The female has two tails, both slender, the outer the shorter."

There can be no difficulty in recognising this species. In both sexes the tails are smaller in every way (breadth and length) than in *S. quercetorum*, Moore, and the female being glossed with purple on the upperside is a character quite unique in the genus, as far as I am aware. It is very distantly removed from the genus *Rapala*, Moore, in which Mr. Distant placed it, the male having no secondary sexual characters, while *Rapala* has them, and the female having two tails, while all *Rapalas* have but one.

783. Surendra florimel, Doherty.

S. florimel, Doherty, Journ. A. S. B., vol. lviii, pt. 2, p. (1889).

HABITAT: Wagung, Tavoy District, Burma.

EXPANSE: ♂, 1·4; ♀, 1·5 inches.

DESCRIPTION: "MALE. UPPERSIDE, *both wings* rich purple-blue. *Forewing* with the blue area occupying nearly half the surface, extending from the costal nervure to the inner margin, outwardly angled at the third median nervule. *Hindwing* with the blue area extending from just below the second subcostal nervule to the submedian nervure, leaving the upper part of the discoidal cell dark; a narrow black marginal line. UNDERSIDE, *both wings* with the ground-colour light fuscous-brown as in *S. amisena*, Hewitson, but with the cell and disc of the forewing much darker, and the basal and apical half of the hindwing deep violet-brown. *Forewing* with a short oblique dark streak in the middle of the cell, a larger

one across its end, and one or two costal streaks; a transverse discal line of joined lunules (separated in *S. amisena*) from the second subcostal nervule to below the first median nervule, projecting outwardly below the lower discoidal nervule; apex widely, and outer margin narrowly pale fuscous. *Hindwing* with the transverse discal fascia consisting of a broken dull silvery line on a deep brown ground, an obscure outer-discal transverse band pale on the dark apical and dark on the pale abdominal ground; an obscure metallic patch in the first median interspace. FEMALE. UPPERSIDE, *both wings* dull brown. *Forewing* with a slightly paler area in the middle of the disc. UNDERSIDE, *forewing* with the dark area of the male confined to the neighbourhood of the median interspaces on the disc. *Hindwing* with the dark area of the male reduced to a band across the wing from the apex to the abdominal margin, crossing the end of the cell; a distinct whitish spot basally between the costal and subcostal nervures, the inner transverse line united, crossing the dark area subapically; the outer one consisting of pale lunules bordered, especially outwardly, by a dark band, in which there are two dark subapical spots, the second larger."

"This species has the hindwing strongly angled at the end of the second median nervule, and quite straight thence to the anal angle; there is no trace of tails or lobes. The forewing is not distinctly falcate in either sex. The egg and venation are as in *S. amisena*, Hewitson, and *S. quercetorum*, Moore. It is a very distinct species, and the male is very richly coloured."

"One male and several females taken on the pass near Wagung, Tavoy district, at 1,500 feet altitude." (*Doherty*, l. c.)

This also is a most distinct species, the absence of tails and of an anal lobe to the hindwing, and the rich blue coloration of the male on the upperside being characters which are not found in any other species in the genus.

Genus 128.—APPORASA, Moore.

Apporasa, Moore, Journ. A. S. B., vol. liii, pt. 2, p. 38 (1884).

"FOREWING, differs from *Thaduka*, Moore, in having the *exterior margin* biangulated and produced outwards below the apex. HINDWING, has the *costa* longer, arched at the base, and produced to an upward angle at the apex; the *exterior margin* is deeply scalloped; it has also three shorter *tails*. *Palpi* long, porrect, second joint extending two-thirds beyond the eyes, third joint also long and slender being half the length of the second; *antennæ* stouter and blunt at tip." (*Moore*, l. c.)

Superficially this genus appears to be a close ally of the next genus *Thaduka*, Moore. The type and only known species, *A. atkinsoni*, Hewitson, is of about the size of *T. multicaudata*, Moore. The forewing has two blunt rounded dentations below the apex, immediately below which again it is almost entire; the hindwing is very dentate, but judging from the figure alone, cannot properly be said to be tailed, nor has it the large anal lobe present in *Thaduka*. The outline of the costa of the hindwing of *Apporasa* is quite different from that of *Thaduka*. The general style of markings of *Thaduka* and *Apporasa* on both surfaces is the same.

Since the above was written, I have been enabled, through the kindness of Mr. W. Doherty, to examine a pair of this species. The hindwing has a distinct spatulate tail from the end of the first median nervule, which is not shown in Hewitson's figure; the anal lobe is small.

784. Apporasa atkinsoni, Hewitson.

Amblypodia atkinsoni, Hewitson, Ill. Diurn. Lep., p. 14*g*, n. 99, pl. iii*b*, figs. 48, 49 (1869); *Apporasa atkinsoni*, Moore, Journ. A. S. B., vol. liii, pt. 2, p. 38 (1884); *Mahathala (Apporasa) atkinsonii*, Doherty, Journ. A. S. B., vol. lviii, pt. 2, p. (1889).

HABITAT: Moulmein (*Hewitson*); Myitta, Tenasserim Valley (*Doherty*).

EXPANSE: ♂, 1·5; ♀, 1·75 to 1·80 inches.

DESCRIPTION: "UPPERSIDE, *both wings* rufous-brown, darkest on the forewing, the wings dentated, marked with blue from the base to beyond the middle. *Forewing* with the costal margin spotted with white. UNDERSIDE, *both wings* pale brown irrorated with darker

colour. *Forewing* dark brown from the base to beyond the middle, the cell crossed by four white lines followed by two similar lines of the same colour, a submarginal band of lunular spots, three oblique white lines near the costal margin. *Hindwing* with its costal margin sinuated, the apex projecting, a triangular brown spot on the costal margin near its base, two black lines at the end of the cell, and a zigzag submarginal black line." (*Hewitson*, l. c.)

"The genus *Apporasa*, Moore, and the species *atkinsonii*, Hewitson, were both I believe founded on a single specimen of uncertain sex with the tails broken off. I took one male and two females of the species near Myitta, having tails greatly resembling those of *Mahathala*, Moore. From that genus they differed in the less acuminate apex of the hindwing, in the egg (which was covered with triangles and tubercles instead of quadrangles and spines, a difference which seems of but small importance in this group), and in the more undulate margin of the hindwing. On this last account the genus might be retained. But the insect has, when sitting on a tree trunk, a marvellous resemblance to a patch of lichen, and the irregular outline adds to that effect. Mimicry of this sort is a sign of great flexibility of structure, and such genera must be judged by severer canons than others, so perhaps *Apporasa* had better be sunk in *Mahathala*." (*Doherty*, l. c.)

Although *A. atkinsoni* possesses a tail similar to *Mahathala ameria*, Hewitson, and the costa of the hindwing is also somewhat similar, yet it is, I believe, in reality nearer to *Thaduka multicaudata*, Moore, than to that species. It has the costa of the forewing as arched as in *T. multicaudata* (considerably more so than in *M. ameria*), and the markings of both surfaces are very similar, therein differing very markedly from *M. ameria*. *A. atkinsoni* has a few metallic green scales scattered over the wings on the underside as in *T. multicaudata*, a feature entirely wanting in *M. ameria*. The male of *A. atkinsoni* is a little smaller than the female, is very similarly marked on both surfaces, but has the purple coloration of the hindwing on the upperside more restricted to the disc, which is a reversal of the usual difference of markings in the sexes of butterflies of this group. Hewitson's figure shows the blue coloration of the upperside much too pale, it is really a rather dark purple.

Genus 129.—THADUKA, Moore. (PLATE XXVII).

Thaduka, Moore, Proc. Zool. Soc. Lond., 1878, p. 836.

"Allied to *Mahathala*, Moore. FOREWING, short, broad; *costa* very convex at base, *apex* acutely angled; *exterior margin* erect, scalloped; *posterior angle* lobular; *hind margin* same length as the costal, concave in the middle. HINDWING, short, broad; *anterior margin* convex, *apex* and *exterior margin* very convex, sinuous, with three prominent *tails*, the middle one longest, *anal lobe* large; *abdominal margin* very concave above anal lobe. Venation similar to *Mathahala* (*Amblypodia ameria*, Hewitson). BODY short, stout. *Antennæ* uniformly thickened to the end. *Palpi* slender. *Legs* short." *Eyes* naked. (*Moore*, l. c.)

This is a very aberrant genus, and, as far as I can ascertain, may be known from all others occurring in India (except some species of *Iraota*, Moore) by having three very distinct tails besides a large anal lobe to the hindwing. A single species of *Thaduka* only is known up to date, and it occurs in Upper Tenasserim.

785. Thaduka multicaudata, Moore. (PLATE XXVII, FIG. 196 ♀).

T. multicaudata, Moore, Proc. Zool. Soc. Lond., 1878, p. 836, pl. lii, fig. 7, *female*.

HABITAT: Taoo, 3000-5000 feet, Upper Tenasserim.

EXPANSE: ♀, 1·62 to 1·90 inches.

DESCRIPTION: "FEMALE. UPPERSIDE, *both wings* purple-black, basal areas bright smalt-blue. *Body* and abdominal border greyish, thorax blue. UNDERSIDE, *both wings* dark vinous-brown. *Forewing* with short subbasal, medial, and an entire discal, purple-black maculate bands, and an outer marginal series of lunules. *Hindwing* with three irregular curved transverse purplish-black maculate bands, and indistinct marginal lunules; a narrow metallic-green lunule above the tails." (*Moore*, l. c.)

The dull metallic-green markings on the underside are more profuse than described by Mr. Moore; there are five increasing spots in the discoidal cell of the forewing, and numerous spots scattered over the hindwing, with a prominent lunular band on the outer margin from the anal angle to the discoidal nervule. I have seen but two specimens of this species, both females, taken by Major C. T. Bingham in the Meplay Valley and Upper Thoungyeen Forests, Burma, in February and April. The male has yet to be discovered. It appears to be an extremely rare species, with a very limited range.

The figure shows both sides of a female example from the Meplay Valley in my collection.

Genus 130.—ARHOPALA, Boisduval. (FRONTISPIECE AND PLATE XXVII).

Arhopala, Boisduval, Voy. Astr., Lép., p. 75 (1832); *Narathura*, Moore, Proc. Zool. Soc. Lond., 1878, p. 835; id., Distant, Rhop. Malay., p. 259 (1885); *Nilasera*, Moore, Lep. Cey., vol. i, p. 114 (1881); *Panchala*, id., Proc. Zool. Soc. Lond., 1882, p. 251; id., Distant, l. c., p. 272; *Satadra*, Moore, Journ. A. S. B., vol. liii, pt. 2, p. 38 (1884); *Darasana*, id., l. c., p. 42; *Flos* and *Iois*, Doherty, Journ. A. S. B., vol. lviii, pt. 2, p. (1889); *Amblypodia*, anctorum (*nec* Horsfield).

WINGS broad. FOREWING, *costa* nearly straight, moderately arched or strongly arched, often distinctly waved towards the apex between the terminations of the nervules; *apex* acute, the acuteness varying in intensity; *outer margin* sometimes straight, sometimes regularly convex, sometimes strongly convex, sometimes slightly concave below the apex, then strongly convex; *inner* margin slightly emarginate in the middle; *costal nervure* short, but varying slightly in length, never reaching to opposite the apex of the discoidal cell; *first* and *second subcostal* and *upper discoidal nervules* with their bases about equi-distant, *third subcostal* nervule rather short, arising nearer to the apex of the wing than to the apex of the cell, varying in length; *middle disco-cellular* nervule given off some little distance beyond the origin of the upper discoidal, very short, straight, outwardly oblique*; *lower* disco-cellular nervule four times as long as the middle disco-cellular, straight, slightly inwardly oblique; *second median* nervule given off some little distance before the lower end of the cell; *first median* nervule curved, bowed downwards soon after its origin, the median nervure angled upwards beyond the point where the first median nervule is given off; *submedian nervure* straight. HINDWING, sometimes entire, sometimes waved, sometimes furnished with a short tail at the termination of the first median nervule, sometimes this tail considerably longer, sometimes there is an additional very short tooth or tail at the termination of the second median nervule, sometimes still a third tail, but very short, at the termination of the submedian nervure; *anal angle* sometimes rounded, sometimes acute, sometimes distinctly lobed; *abdominal margin* sometimes straight, sometimes convex to the termination of the internal nervure, then slightly emarginate; *costa* sometimes regularly arched, sometimes bowed at base, then quite straight, sometimes the outer margin is anteriorly produced at the apex thus causing the costa to be sinuate; *costal nervure* sometimes nearly straight, sometimes considerably bowed, sometimes lying quite close to the margin, sometimes well removed from it; *first subcostal nervule* arched, given off some little distance before the apex of the cell; *upper disco-cellular* nervule shorter than the lower, slightly concave, slightly outwardly oblique, *lower* disco-cellular sometimes upright, sometimes slightly inwardly oblique, straight or slightly concave; *second median nervule* emitted always a little before the lower end of the cell; *submedian nervure* a little waved; *internal* nervure short, recurved. *Antennæ* short, less than half the length of the costa of the forewing, with a gradually-formed, attenuated club. *Palpi* moderately long, porrect. *Eyes* smooth. *Body* moderately robust.

LARVA onisciform, posteriorly flattened, bristly at the sides. PUPA of the usual lycænid shape. The transformations of three species are known, *A. centaurus*, Fabricius, and *A. amantes*, Hewitson, from Ceylon, and *A. apidanus*, Cramer, from Java.

* In some species the middle disco-cellular appears almost to form the base of the lower discoidal nervule, being nearly as thick as that vein, in other species the middle disco-cellular is but little thicker than the lower, in others again both are equally thin.

The genus *Arhopala* was instituted by Boisduval for the reception of two new species of butterflies, the one from Papua which he named *A. phryxus*, and the other from the Aru Islands which he named *A. meander*. He gave no diagnosis of the genus, except that the insects are rather large, and the only authors who have used it in the sense understood in this work, and, indeed, at all, are Drs. Staudinger and Felder. The former eminent writer quite correctly saw that the genus *Amblypodia* of Horsfield, of which *narada*, Horsfield, is the type, differs so entirely in structure and *facies* from the mass of butterflies generally placed under that name that it could not be correctly used for them. During the last ten years Mr. Moore has tried to split up the genus *Arhopala* by proposing seven new genera. Mr. Distant in his "Rhopalocera Malayana" refers to four of these only, and sinks two of them as synonyms, retaining two only as distinct, but with much doubt. He ignores the two genera *Darasana* and *Mahathala* of Mr. Moore, and the *Arhopala* of Dr. Felder, entirely, though representatives of all of them occur in the Malay peninsula. Having very carefully examined the neuration and outline of the wings of these seven genera of Mr. Moore, I have no hesitation in sinking five of them as synonyms, and I retain two of them with great reluctance, *viz.*, *Mahathala* for a single species which presents two very aberrant features, and *Acesina* with two species, which have rather a peculiar *facies* as regards the markings of the underside. In the above diagnosis of the genus *Arhopala*, I have tried to point out the chief differences that exist in the structure of the insects of this genus. It will be noticed that the venation differs but little, but the outline of the wings, especially of the hindwing, is very variable. I find it impossible, however, to draw any line of demarcation between the species which would enable them to be distinguished as belonging to distinct genera, much as I should like to be able to do so. The genus as it stands is most unwieldy, but it is no gain either to science or to convenience to imagine generic distinctions where none exist. The most obvious structural character is the presence or absence of a tail or tails to the hindwing, but in the same page in which Mr. Moore described the genus *Panchala* he placed under it tailed and tailless species. And so with the other genera, though he gives the presence or absence of the tail as a generic character, he indiscriminately mixes up species with and without tails under the same generic name. Generic characters may still be found by which to divide these butterflies satisfactorily when the eggs, the prehensores of the males, and the legs of both sexes come to be examined, but it appears to me hopeless to look further for such characters in either venation or outline of wings. Mr. Doherty's proposed new genera, *Flos* and *Iois*, cannot properly be discussed here, as no diagnosis of them has been written.

An *Arhopala* is unmistakable, the merest tyro in Oriental butterflies should at once be able to distinguish any species as belonging to the genus, which contains some of the largest as well as most beautiful of oriental *Lycænidæ*. Nearly all the species are of some shade of blue or purple on a black ground on the upperside, the females with the blue or purple colour always more restricted than in the male. A few species of the *eumolphus* group are, however, brilliant shining green on the upperside of the males, but their females are of the ordinary purple type.* Most fortunately the undersides of both sexes are practically marked

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* Since the above was written, Mr. Doherty has lent me the MS. of a paper to be hereafter published, in which the following most interesting note is given :—"A word deserves to be spoken on the subject of green butterflies, since it seems one little understood at home. Early in the century Horsfield professed to have found a green female of the Javan *Arhopala eumolphus*, Cramer, the true female of which is blue. Recently Mr. Distant has described as the female of his *A. farquharii*, a butterfly bright green over the basal half of the wings above. Now the real female of *A. farquharii* (perhaps the form described as "*Narathura*" *maxwellii*, Distant) is violet-blue, and one of the most constant of butterflies. Of the green form mentioned I have taken several specimens in the Malay Peninsula and in Borneo, and they are all males. It is a rare species, undescribed, perhaps identical with the Horsfieldian form."

"Grant Allen shews that while greenish flowers are amongst the oldest, really green flowers are the most recently developed of all, and among the most conspicuous. Very much the same thing is true of *Lepidoptera*. Pale green moths like *Actias*, *Geometra* and *Pyralis* are protected by their colouring which is common to both sexes, and are quite hidden when resting among the leaves. Such seems also to be the case with *Lehera eryx*, Linnæus, a lycænid which is greenish on the *underside*, and may possibly be the case with some *Catopsilias* [a genus of the next subfamily, the *Pierinæ* or "Whites"]. But bright metallic-green is, I think, the latest-developed colour among butterflies, and decidedly the most conspicuous. No one who has not seen it can imagine the brilliancy of *Arhopala farquharii* or *Ornithoptera brookeana*, Wallace, [*Ornithoptera* is a genus or subgenus of the *Papilioninæ*] in the greenest jungle. The brightest of the metallic-blue butterflies look dim beside them. It may be confidently asserted of all such butterflies, that unless the species is protected, only the male is green. The protected *Ornithopteras* have sometimes assumed green colours as well as golden and orange, and the female shares in this useful ornamentation to a slight degree,

alike, they are usually of some shade of grey or brown, with numerous darker spots and catenulated bands. Many species have patches of metallic green or blue scales at the anal angle of the hindwing. Secondary sexual characters in the male are entirely absent, unless the differently-shaded round patch of scales on the upperside of the forewing in *A. atosia*, Hewitson, and *A. antimuta*, Felder, can be so considered.

About one hundred species of *Arhopala* have been described up to date, most of which are strictly Oriental, and occur in India, Ceylon, the Andaman Isles, Burma, the Malay peninsula, and throughout the Malay archipelago; some species are found in China and Japan, and one or two have been recorded from Northern Australia. Mr. Distant* refers to the great variation which he has found to exist in the markings of the underside of the wings of species of this genus. As far as my experience of the Indian species goes, I have not found this variation of any very great extent, or of such a character as to render the identification of species difficult. The opposite may be the case, however, with the species occurring in the Malay Peninsula. He also remarks that "the shade of blue on the upperside is often so different as to lead to only two conclusions, *viz.*, either that we are dealing with the most closely allied species, or with seasonal forms of one species." With regard to the last remark, I have not noticed that seasonal variation occurs within strict Indian limits, nor have I found that the shade of blue is given to much variation. It is also said to be difficult in some instances to identify the species Mr. Hewitson described, the type specimens not agreeing with his figures and descriptions. As Mr. Hewitson, I believe, never placed a type ticket *on* his type specimens, but only the name of the species under his series of specimens of it, and not improbably may have substituted different and better specimens for those he originally described, if these were not in good condition, it appears to me that when specimens have been obtained which agree better with his plates and descriptions than with the specimens standing under those names in his collection (which may indeed represent totally distinct species), they should be named in accordance with the plates and descriptions, and not in accordance with the specimens against which the names stand in his collection. Even in the case of types which have been properly labelled, the tickets may be changed or lost, so that when a species can be named with certainty from figures and descriptions, the type specimens may be ignored.

I think I am correct in saying that all *Arhopalas* are given to haunting trees and bushes, and, broadly speaking, are forest butterflies. The males, I believe, seldom or never go down to the beds of mountain streams to suck up moisture, nor are they ever found on flowers. They do not fly much either, so almost the only way to catch them is to beat the bushes and lower branches of the trees, and catch them as they fly up or watch where they settle. They have a rather quick flight, but usually fly but for a short distance even when disturbed. Many species seem to be very common where they occur; others again appear to be very rare. Owing to their skulking habits, and to the consequent difficulty in collecting them, many new species doubtless yet remain to be discovered.

I give below as foot-notes† the original diagnoses of the several genera proposed by Mr. Moore for species which I include under *Arhopala*.

In non-protected butterflies the green is confined to the upperside, and is quite invisible except during flight. In the *Lycænidæ* it is found in many *Zephyri*, in some *Poritias* and *Massagas*, in a few *Arhopalas* and in *Lampides marakata*, Doherty, a rare butterfly I discovered in the Malay Peninsula, and named after its emerald tint above. Among all these whenever the female is known, it is blue, orange, black, violet, or any other colour but green. The conservative and, in butterflies, unadorned sex, has not yet acquired the latest development in colours. It is also remarkable that the green colours seem to occur where the genus is most dominant. The Malay Peninsula and Borneo form the great centre of development of the genera *Arhopala* and *Lampides*, it is there that most of the green species occur. The outlying *Arhopalas*, those of the North-West Himalayas and the Timorian Islands, are all blue. In *Zephyrus* the green species are found only where the genus is best represented and most vigorous. *Zephyrus pavo*, de Nicéville, a species found in the Bhutan and Assam hill-ranges, remote from the regular habitat of the genus, has, I discovered the male blue and greatly resembling the allied females from the Western Himalayas. The green and orange *Ornithopteras* also occur only in the heart of the *Ornithoptera* region. These remarks on green butterflies also apply in some degree to certain other *unusual* colours of great brilliancy, such as the shining coppery-gold of *Ilerda brahma*, Moore, and the fiery red of *Thamala marciana*, Hewitson. It ought to be borne in mind that such colours ought never to be ascribed to a female without careful examination."

* Rhopalocca Malayana, p. 463 (1886).

† Genus NARATHURA, Moore. *Narathura*, Moore, Proc. Zool. Soc. Lond., 1878, p. 835. "WINGS, broad. FOREWING, very convex at base of costa, exterior margin rounded, even. HINDWING, very convex externally, with even margin; a very slender tail at end of first median nervule (so delicate that in most cabinet specimens it is broken off); anal angle not lobed. Type, *N. hypomuta* (*Amblypodia hypomuta*, Hewitson, Cat. *Lycænidæ* B. M., p. 11, n. 52, pl. vi, figs. 63, 64, *male* (1862)." (*Moore*, l. c.)

Key to the Indian species of Arhopala.

A. Hindwing with tail at apex of first median nervule.
a. Tail long (except in No. 812, *A. artegal*, Doherty, in which it is short and tooth-like).
a¹. Male, upperside, both wings of some shade of blue or purple.
a². Male, upperside, both wings, of a blue or purple colour often shining but never metallic.
a³. Male, upperside, both wings dark blue or purple.
a⁴. Both sexes, underside, forewing with annular spots in cell.
a⁵. Both sexes, expanse two inches and over.
a⁶. Both sexes, hindwing with no anal lobe.
786. A. CENTAURUS, Eastern Himalayas, Assam, Burma, Malay Peninsula, Siam, South India, Ceylon, Andaman Isles, Sumatra, Nias Island, Java, Borneo.
b⁶. Both sexes, hindwing with an anal lobe.
a⁷. Male, upperside, both wings with no outer black margin, cilia only black.
787. A. AGNIS, Burma, Malay peninsula, Sumatra.
b⁷. Male, upperside, both wings with outer black margin.
a⁸. Both sexes, underside, forewing with a costal spot just beyond the middle.
a⁹. Male, upperside, both wings margined narrowly with black.
a¹⁰. Male, forewing, outer margin straight; hindwing posteriorly elongated. Forewing, underside, second spot from costa of discal band larger than the spot on either side of it.
788. A. SILHETENSIS, Jalpaiguri, Sylhet.
b¹⁰. Male, forewing, outer margin convex; hindwing rounded, not posteriorly produced. Forewing, underside, second spot from costa of discal band of the same size as the spot on either side of it.
789. A. ADOREA, Sikkim, Assam, Burma, Malay peninsula.

Genus NILASERA, Moore. *Nilasera*, Moore, Lep. Cey., vol. i, p. 114 (1881). "WINGS, ample. FOREWING, subtriangular; *costa* much arched from the base, *apex* acute; *exterior margin* very slightly oblique and convex at lower angle. *posterior* margin recurved; *costal nervure* short, extending only to one-third the margin; *subcostal nervules* at equal distances apart, *first* subcostal at three-fifths before the end of the cell, *fourth* subcostal at two-thirds from the third and terminating at the apex, *fifth* subcostal from the end of the cell; upper [*middle*] *disco-cellular* nervule shortest, oblique, *lower* disco-cellular erect; radial [*lower discoidal*] nervule from their angle; *discoidal cell* long, more than half length of wing; *second median* nervule at one-fifth, and *first* median at two-fifths before the end of the cell; *submedian nervure* straight. HINDWING, broadly oval; *costa* very convex; a short thickish *tail* from first median nervule; *anal angle* somewhat pointed and not lobed; *costal nervure* abruptly arched from base; *first subcostal nervule* at nearly one-half before the end of the cell; *upper disco-cellular* nervule shortest, outwardly oblique, *lower* disco-cellular recurved; *discoidal* nervule from their angle; *second median* nervule at one-sixth, and *first* median at one-third before the end of the cell; *submedian nervure* nearly straight; *internal* nervure recurved. BODY robust; *thorax* stout; *palpi* porrect, second joint very flat, attenuated towards the apex, squamose, projecting half beyond the head, third joint slender in the female, one-third length of second; *legs* squamose; *antennæ* gradually thickened towards the end, tip more slender. Type, *N. centaurus*, Fabricius." (*Moore*, l. c.)

Genus PANCHALA, Moore. *Panchala*, Moore, Proc. Zool. Soc. Lond., 1882, p. 251. "WINGS, small, short, broad. FOREWING, much arched; *exterior margin* erect, slightly convex hindwards; *discoidal cell* extending beyond half the wing; *costal nervure* extending to nearly half the margin; *first subcostal nervule* emitted at two-fifths and *second* subcostal at one-fifth before the end of the cell, *third* subcostal bifid at one-third before the apex, *fifth* subcostal from slight angle at end of the cell; *disco-cellular* nervule slightly bent near upper end; *discoidal* nervule from the angle; *second median* nervule near end of the cell, *first* median at one-fourth before the end, curved downwards; *submedian nervure* straight. HINDWING, very convex externally; *costa* much recurved from the base, *apex* angular; *costal nervure* recurved, extending to the apex; *first subcostal nervule* emitted at one-third before the end of the cell; *disco-cellular* nervule slightly bent in the middle, *discoidal* nervule from the angle; *second* and *third median* nervules from the end of the cell, *first* median at one-fourth before the end; *submedian nervure* straight, *internal* nervure recurved. BODY, short, *thorax* moderate; *palpi* porrect, compactly squamose, second joint projecting half its length beyond the head, third joint one-third its length, slender; *legs* compactly squamose; *antennæ* short, thickening to the apex. Type, *P. ganesa*, Moore." (*Moore*, l. c.) Mr. Moore describes only one disco-cellular nervule in both wings, of course there are two.

Genus SATADRA, Moore. *Satadra*, Moore, Journ. A. S. B., vol. liii, pt. 2, p. 38 (1884). "FOREWING, comparatively longer and narrower than in typical *Panchala*, Moore, the *costa* abruptly arched at the base, *exterior margin* oblique. HINDWING, slightly but regularly arched along the *costa*, *apex* very convex, *exterior margin* oblique, with a slender *tail* at the end of the first median nervule, and a point at the ends of the second median nervule and submedian nervure. *Venation* similar to that of *Panchala*. Type, *S. atrax*, Hewitson." (*Moore*, l. c.) Mr. Moore should have mentioned the distinct lobe at the anal angle of the hindwing present in the type species.

Genus DARASANA, Moore. *Darasana*, Moore, Journ. A. S. B., vol. liii, pt. 2, p. 42 (1884). "FOREWING, short, broad, triangular; *apex* acute, *exterior margin* very slightly oblique, *posterior angle* somewhat rounded. HINDWING, short, broad; *costa* arched towards the base, *exterior margin* very convex; no *tail* [or *anal lobe*]. *Antennæ* slender. Type, *D. perimuta*, Moore." (*Moore*, l. c.)

b[4]. Male, upperside, both wings margined broadly with black.

790. A. VENDAVA, Burma.

b[8]. Both sexes, underside, forewing with no costal spot just beyond the middle.

a[9]. Both sexes, underside, hindwing with discal band continuous.

791. A. AMANTES, India, Ceylon, Burma, South Andaman Isles, Makassar.

b[9]. Both sexes, underside, hindwing with discal band anteriorly broken up into spots in pairs.

792. A. VIHARA, Burma, Malacca, Nias Island.

b[5]. Both sexes, expanse two inches and under.

a[6]. Male, upperside, forewing with a round discal patch of scales of a different shade in some lights to the scales on the rest of the wing; no outer black margin, cilia only black.

793. A. ATOSIA, Burma, Malay peninsula, Sumatra, Borneo.

b[6]. Male, upperside, forewing with no differently-coloured discal patch; with outer black margin, often very narrow.

a[7]. Both sexes, underside, hindwing, costa at middle with a prominent whitish spot.

a[8]. Both sexes, hindwing, costa straight, apex acute, with three tails.

794. A. ABSEUS, Sikkim, Assam, Burma, Malay peninsula, Borneo.

b[8]. Both sexes, hindwing, costa slightly emarginate, apex rounded, with one tail.

795. A. AMMON, Burma, Malay peninsula.

b[7]. Both sexes, underside, hindwing, costa at middle with no prominent whitish spot.

a[8]. Both sexes, underside, both wings without silky gloss; tail slender, filiform, not wedge-shaped.

a[9]. Both sexes, underside, forewing with discal band continuous, unbroken.

a[10]. Both sexes, underside, both wings reddish-brown, markings small and indistinct.

796. A. ŒNEA, Sikkim, Assam.

b[10]. Both sexes, underside, both wings brown, more or less washed with purple, markings prominent.

a[11]. Both sexes, underside, forewing with discal band broad.

a[12]. Male, upperside, both wings deep purple, outer black margins narrow.

797. A. AGABA, Burma.

b[12]. Male, upperside, both wings lighter, more bluish-purple than in *A. agaba*, outer black margins fully three times as broad; underside, forewing with discal band broader, more regular and more continuous.

798. A. SELTA, Burma.

b[11]. Both sexes, underside, forewing, with discal band narrow.

a^{12}. Male, upperside, both wings with outer black border narrow, coloration shining bluish-purple.

799. A. CANARAICA, South India.
800. A. ALBA, India.

b^{12}. Male, upperside, both wings with outer black border twice as broad as in *A. canaraica* and *A. alea*, coloration duller purple.

801. A. ATRAX, India.

b^{9}. Both sexes, underside, forewing with discal band discontinuous, broken.

a^{10}. Male, underside, botb wings not powdered with grey; upperside, both wings bluish-purple.

a^{11}. Both sexes, underside, both wings glossed with purple.

802. A. AIDA, Burma.

b^{11}. Both sexes, underside, both wings not glossed with purple.

803. A. RAFFLESII, Burma, Malay peninsula.

b^{10}. Both sexes, underside, both wings powdered with grey.

a^{11}. Male, upperside, forewing, outer black border broad.

a^{12}. Botb sexes, underside, forewing with markings of the ground-colour of the wing, prominently outlined with white, broad.

804. A. BAZALUS, Nepal, Assam, Java,

b^{12}. Male, underside, forewing with markings much deeper coloured tban tbe ground, obscurely outlined with greyish, narrow.

805. A. SINGLA, Sikkim.

b^{11}. Male, upperside, both wings very deep purple, almost black ; outer black borders much narrower than in *A. bazalus* and *A. singla*.

806. A. TEESTA, Sikkim, Sylhet, Burma.

b^{8}. Both sexes, underside, both wings with a silky gloss ; tail rather short, thick, wedge-shaped.

807. A. RAMA, Himalayas, Burma, China.

b^{4}. Both sexes, underside, forewing with no annular spots in cell, but with a prominent pale usually quadrate spot near the end of the cell.

a^{5}. Both sexes, underside, hindwing with the usual macular discal band.

a^{6}. Both sexes, underside, hindwing with prominent black spots on anal region heavily overlaid with metallic green scales.

808. A. ASOKA, Sikkim,

b^6. Both sexes, underside, hindwing with no prominent black spots on anal region heavily overlaid with metallic green scales; if present at all, obsolescent.

809. A. ADRIANA, Sikkim.

b^5. Both sexes, underside, hindwing with the usual macular discal band replaced by a lengthened dark fascia.

a^6. Both sexes, underside, hindwing with the broad subbasal fascia entire.

a^7. Both sexes, underside, hindwing with the apex pale purple.

810. A. APIDANUS, Burma, Malay peninsula, Sumatra, Java, Borneo.

b^7. Both sexes, underside, hindwing with the apex marked with a prominent dark patch.

a^8. Male, upperside, both wings with marginal border reduced to a more thread.

811. A. FULGIDA, Sikkim, Khasi Hills, ? Phillippines.

b^8. Male, upperside, both wings with marginal black border very broad, occupying more than half the surface, tail very short.

812. A. ARTEGAL, Burma.

b^6. Both sexes, underside, hindwing with the broad subbasal fascia broken up into spots.

813. A. DIARDI, Assam, Malay peninsula, Siam.

b^3. Male, upperside, both wings light blue.

a^4. Of very large size, over two inches in expanse; both sexes, underside, both wings with small, well-separated, distinct black white-bordered markings.

814. A. CAMDEO, Sikkim, Assam, Chittagong Hill Tracts.

b^4. Of smaller size, under two inches in expanse; underside, forewing, discal band formed of confluent fuscous spots, not outwardly defined with white.

a^5. Underside, both wings without silky gloss; tail slender, filiform.

a^6. Male, upperside, both wings pale purplish-lilac blue, with anteciliary black thread only.

815. A. OPALINA, Assam.

b^6. Female, upperside, both wings rich cerulean-blue, with broad black outer borders.

816. A. WIMBERLEYI, South Andaman Isles.

b^6. Underside, both wings with a silky gloss; tail rather short, thick, wedge-shaped.

817. A. DODONÆA, Western Himalayas.

b^2. Male, upperside, both wings brilliant metallic blue.

a^3. Of large size, over two inches in expanse.

a^4. Male, upperside, both wings, blue colour deep and rich, of uniform tint throughout.

818. A. ANTHELUS, Burma, Malay peninsula.

b^4. Male, upperside, both wings, disc silvery blue, gradually merging into the deeper purple costal and outer margins.

819. A. ANARTE, Burma, Malay peninsula, Borneo.

b^3. Of smaller size, under two incbes in expanse.

a^4. Underside, hindwing with a prominent broad white fascia below the costa at right angles to the body.

820. A. SUBFASCIATA, Burma.

b^4. Underside, hindwing with no prominent broad white fascia below the costa at right angles to the body, ground uniformly coloured tbroughout.

821. A. ALBOPUNCTATA, Burma.

b^1. Male, upperside, both wings brilliant metallic green.

a^2. Both sexes, underside, botb wings with a silky gloss.

822. A. EUMOLPHUS, Eastern Himalayas, Assam, Chittagong Hill Tracts, Java.

b^2. Both sexes, underside, both wings, without silky gloss.

a^3. Male, upperside, both wings with the outer black margins broad; underside, both wings not irrorated with white.

823. A. FARQUHARI, Burma, Malay peninsula, S.-E. Borneo.

b^3. Male, upperside, both wings with the outer black margins narrow; underside, both wings irrorated with white.

824. A. HELLENORE, Burma.

b. Tail very short, tooth-like. Male, upperside, both wings rich ultramarine-blue as in *A. areste*, outer black margins very narrow.

825. A. MOELLERI, Sikkim, Assam.

B. Hindwing with no tail at apex of first median nervule.

a. Underside, hindwing with no green or blue metallic scales on margin at anal angle.

*a*¹. Underside, both wings brown throughout, except inner margin of forewing which is paler.

*a*². Upperside, both wings shining deep morpho-blue; underside, both wings with all markings obscure and ill-defined, no annular markings whatever.

826. A. ANDAMANICA, Andaman Isles.

*b*². Upperside, both wings purple; underside, both wings with all markings prominent, annular and well-defined.

*a*³. Of small size, 1·4 incbes and under in expanse; underside, forewing, disco-cellular spot not joined to broad transverse band below median nervure.

*a*⁴. Upperside, hindwing, purple area not extending beyond middle of wing; underside, both wings with markings very small.

827. A. PARAMUTA, Nepal, Sikkim.

*b*⁴. Upperside, hindwing, cobalt-blue or violet-blue area extending to basal two-thirds; underside, both wings with markings larger and more distinct.

*a*⁵. Upperside, both wings brilliant cobalt-blue.

828. A. ZETA, Andaman Isles.

*b*⁵. Upperside, both wings violet-blue.

829. A. ROONA, Andaman Isles.

*b*³. Of larger size, 1·5 incbes and over in expanse; underside, forewing, disco-cellular spot joined to broad transverse band below median nervure.

830. A. TOUNGUVA, Andaman Isles, Burma.

*b*¹. Underside, both wings rufous throughout, except inner margin of forewing, which is paler.

831. A. ASOPIA, Burma.

*c*¹. Underside, both wings brown glossed with purple.

*a*². Underside, forewing, discal band broad, continuous, not divided into well-separated spots.

*a*³. Of small size, 1·5 inches and under; underside, hindwing with a broad pale ochreous discal transverse band.

832. A. PERIMUTA, Sikkim, Assam, Burma

*b*³. Of larger size, 1·5 inches and over; underside, hindwing with no broad pale discal transverse band.

*a*⁴. Hindwing, outer margin even, entire; upperside, hindwing with a very small patch of blue towards base of wing.

833. A. DUESSA, Burma.

*b*⁴. Hindwing, outer margin toothed at the end of each vein; upperside, both wings, outer margin narrowly black, rest of surface rich ultramarine-blue.

834. A. ARESTE, Nepal, Sikkim.

*b*². Underside, forewing, discal band formed of five round well-separated annular spots.

835. A. BELPHŒBE, Burma.

*d*¹. Underside, both wings cream-white; hindwing, costa sinuous, apex produced.

836. A. GANESA, Western Himalayas.

b. Underside, bindwing with green or blue metallic scales on margin at anal angle.

*a*¹. Male, upperside, botb wings light blue, black borders very broad.

837. A. BIRMANA, Burma.

*b*¹. Male, upperside, botb wings morpho-blue, outer black border narrow, wide in female.

*a*². Underside, forewing, second spot from costa of discal band no larger than spot on either side of it.

838. A. MOOLAIANA, Burma.

*b*². Underside, forewing, second spot from costa of discal band much larger than spot on either side of it.

839. A. PASTORELLA, Burma.

*c*¹. Male, upperside, forewing violet-blue, bindwing morpho-blue; outer black borders rather broad.

840. A. METAMUTA, Burma, Malacca, Sumatra.

*d*¹. Male, upperside, botb wings ultramarine-blue; outer black border narrow, thread-like.

841. A. HYPOMUTA, India, Penang, Malacca, Borneo.

*e*¹. Male, upperside, both wings violet-blue; outer black borders broad.

842. A. PERISSA, Burma.

f^1. Male, upperside, both wings dark blue ; outer black borders narrow.

a^2. Underside, forewing with bands and spots of the ground-colour, outwardly defined with greyish.

843. A. AGELASTUS, Burma.

b^2. Underside, forewing with bands and spots whitish.

844. A. CHINENSIS, ? Sikkim, South China

g^1. Male, upperside, both wings deep purple ; outer black borders narrow, thread-like.

845. A. DAVISONII, Burma, Malay peninsula, Borneo.

786. Arhopala centaurus, Fabricius.

Papilio centaurus, Fabricius, Syst. Ent., p. 520, n. 329 (1775) ; idem, id., Sp. Ins., vol. ii, p. 117, n. 523 (1781) ; idem, id., Mant. Ins., vol. ii, p. 68, n. 646 (1787); *Hesperia centaurus*, id., Ent. Syst., vol. iii, pt. 1, p. 275, n. 63 (1793) ; *Polyommatus centaurus*, Godart, Enc. Méth., vol. ix, p. 658, n. 138 (1823) ; *Amblypodia centaurus*, Horsfield, Cat. Lep. E. I. C., p. 102, n. 33 (1829) ; id., Hewitson, Cat. *Lycœnidœ* B. M., p. 3, n. 15, pl. ii, figs. 10, 13, *male* (? figs. 12, *male* ; 11, *female*) (1862) ; id., Moore, Proc. Zool. Soc. Lond., 1865, p. 775 ; id., Butler, Cat. Fab. Lep. B. M., p. 179, n. 1 (1869) ; id., Druce, Proc. Zool. Soc. Lond., 1874, p. 107, n. 1 ; id., Butler, Trans. Linn. Soc. Lond., Zoology, second series, vol. i, p. 548, n. 1 (1877); *Narathura centaurus*, Distant, Rhop. Malay., p. 261, n. 1, pl. xxi, figs. 4, *male* ; 5, *female* (1885) ; *Nilasera centaurus*, Moore, Journ. Linn. Soc. Lond., Zoology, vol. xxi, p. 44 (1886) ; *Amblypodia pseudocentaurus*, Doubleday, List. Lep. B. M., vol. ii, p. 24 (1847) ; *Arhopala centaurus*, var. *coruscans*, Wood-Mason and de Nicéville, Journ. A. S. B., vol. xlix, pt. 2, p. 234, n. 54 (1880) ; *Polyommatus helus*, Godart, Enc. Méth., vol. ix, p. 652, n. 119 (1823) ; *Amblypodia nakula*, Felder, Wien. Ent. Monatsch., vol iv, p. 395, n. 4 (1860) ; id., Druce, Proc. Zool. Soc. Lond., 1873, p. 353, n. 1 ; id., Kheil, Rhop. Nias, p. 33, n. 121 (1884) ; *Arhopala nakula*, Felder, Reise Novara, Lep., vol. ii, p. 222, n. 224, pl. xxix, fig. 14 (1865) ; id., Moore, Proc. Zool. Soc. Lond., 1877, p. 590 ; idem., id., l. c., 1878, p. 835 ; id., Wood-Mason and de Nicéville, Journ. A. S. B., vol. l, pt 2, p. 251, n. 77 (1881) ; *Nilasera pirama*. Moore, Lep. Cey., vol. i, p. 116, pl. xliii, figs. 3, 3*b*, *male* ; 3*a*, *female* ; 3*c*, *larvæ* and *pupa* (1881) ; *Nilasera pirithous*, id., Proc. Zool. Soc. Lond., 1883, p. 531.

HABITAT : Eastern Himalayas, Assam, Burma, Malay Peninsula, Siam, South India, Ceylon, Andaman Isles, Nias Island, Sumatra, Java, Borneo.

EXPANSE : ♂, ♀, 1·8 to 2·4 inches.

DESCRIPTION : Typical race *centaurus*, Fabricius. " MALE. UPPERSIDE, *both wings* dark violaceous-blue, [with narrow outer black margins]. *Cilia* brownish. UNDERSIDE, *both wings* ochraceous-brown. *Forewing* with two looped spots, margined with pale bluish in the cell, and a subquadrate spot, inwardly margined with pale bluish and outwardly with greyish, at the end of the cell, a waved fascia margined with greyish crossing the wing beyond the cell, and the following spots margined with greyish :—one near the costa above the end of the cell, and two beneath the cell divided by the first median nervule ; the apical third of the wing is somewhat paler, and contains a marginal and submarginal dark fascia. *Hindwing* with the following spots and fasciæ margined with greyish :—seven basal spots, a medial transverse fascia, which is connected above at the second subcostal nervule with a broken macular fascia extending to the abdominal margin ; a marginal and two submarginal somewhat obscure fasciæ ; three transverse marginal metallic greenish spots near the anal angle. *Body* and *legs* more or less concolorous with the wings. FEMALE. UPPERSIDE, *both wings* violaceous-blue. *Forewing* with the costal and outer margins broadly fuscous. *Hindwing* with the costal margin broadly, and the outer margin narrowly, fuscous. UNDERSIDE, *both wings* as in the male."

" This is the true *Papilio centaurus*, Fabricius, of which I have satisfied myself by a comparison with the Fabrician type contained in the Banksian collection in the British Museum. Considerable confusion exists as to the true identity of this species, and this has been greatly due and is still frequently caused by the erroneous representations of the species given by the late Mr. Hewitson, which seem to apply to a variety or distinct species found in Continental India. It is probably these figures which have induced many to consider as distinct the Malay butterfly described by Felder under the name of *Amblypodia nakula*. Mr. Kirby, in his Catalogue, placed the two species as synonymous with one another ; and to render the matter as complicated as possible, N. M. Kheil has recently pointed out that Mr. Kirby is wrong, and uses Felder's name as distinct from the Fabrician. Mr. Butler, in 1869, corrected this error, but his remarks appear to have been overlooked."

"This is an abundant lycænid in the Malay Peninsula, and its distribution extends through Tenasserim into Burma, but, owing to the confusion as to identity, its *known* geographical area is somewhat difficult to ascertain." (*Distant*, l. c.)

The solitary character by which I can distinguish the true *A. centaurus*, Fabricius, from the north-east Indian local race, *A. pirithous*, Moore, is that the male on the upperside has an extremely narrow outer black margin, which is almost confined to the cilia, while in *A. pirithous* this black border is a good deal wider, though still narrow. True *A. centaurus* occurs throughout Burma, and thence southwards to Singapore, in Nias Island, Sumatra, and Borneo. I append a description of this form, which was described by Felder as a distinct species under the name *A. nakula*.*

Local race *pirithous*, Moore. DESCRIPTION: "Allied to *N.* [= *A.*] *nakula*, Felder, [= true *A. centaurus*, Fabricius]. MALE. UPPERSIDE, *both wings* differ in being of a pale purplish-blue, also with a black narrow marginal band. UNDERSIDE, *both wings* darker. *Forewing* with the markings less distinct, the inter-discal space bordering the lunular bands dusky purplish iron-grey. *Hindwing* with similarly disposed markings, which are all dusky purplish iron-grey, more strongly defined in the male than in the female. FEMALE. UPPERSIDE, *both wings* of a brighter purple-blue than in *N. nakula*." UNDERSIDE, *both wings* as in the male.

"*N. centaurus*, Fabricius, and *N. pseudocentaurus*, Doubleday, are both distinct from the above." (*Moore*, l. c.)

Placing side by side fresh male specimens of true *A. centaurus* from Singapore and fresh specimens of *A. pirithous* from Sikkim and Assam, I can detect no difference in the shade of purple, the solitary character which separates the local race *pirithous* from true *centaurus* being, as stated above, the rather broader outer black margin to both wings on the upperside of the male. The undersides are equally variable in both forms, and there are no distinguishing features whatever between their respective females. This local race occurs commonly at low elevations in Sikkim and throughout Assam.

Local race *pirama*, Moore. DESCRIPTION: "MALE. UPPERSIDE, *both wings* brilliant ultramarine-blue, with a marginal black band. UNDERSIDE, *both wings* brown, suffused with purple-grey. *Forewing* with slender white-bordered discoidal marks, less defined discal band, streaks below the cell, and submarginal fasciæ. *Hindwing* with very indistinct browner basal spots, discal band, and submarginal lunular line; a few green speckles above the

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* *Amblypodia nakula*, Felder, Wein. Ent. Monatsch., vol. iv, p. 395, n. 4 (1860); *Arhopala nakula*, id., Reise Novara, Lep., vol. ii, p. 222, n. 244, pl. xxix, fig. 14 (1865). HABITAT: Malacca interior, Sumatra EXPANSE: 2·3 inches. DESCRIPTION: "Wings shortly tailed. UPPERSIDE, *both wings* deep violet-cyaneous. UNDERSIDE, *both wings* deep brown. *Forewing* with three fuscous cellular spots circled with bluish, and a pair of exterior fuscous fasciæ circled with whitish. *Hindwing* with differently-shaped basal spots, an irregular discal fascia and a posterior undate striga fuscous circled with paler, three anal black lunules most densely sprinkled with cyaneous-greenish. FEMALE. UPPERSIDE, *both wings* deep violet-cyaneous. *Forewing* with the costa, the apical and external borders, *hindwing* with the costa broadly and the anal margin fuscous."

"Allied to *A. centaurus*, Fabricius."

"English authors from the celebrated Horsfield to Moore (whom he had the good fortune to have as his successor) combine under this one name [*Amblypodia*] very different species; but we consider Boisduval's name *Arhopala* more suitable for these insects, so remarkable for their antennæ being so slightly clavàte; as however this name has not yet been published with a description, we retain for the present Horsfield's name." (*Felder*, l. c., in Wien. Ent. Monatsch.)

"MALE. UPPERSIDE, *both wings* violet-blue, very narrowly blackish-fuscous on the costa and the exterior margin. *Hindwing* with the costal and interior margins fuscous. UNDERSIDE, *both wings* reddish fuscous. *Forewing* pale over nearly the interior half, a pair of rings in the cell and a spot closing the cell, of a deeper tint and partly encircled with metallic whitish-green; and the following fuscous markings obsoletely margined with whitish:—two interior spots interiorly diffuse, and a very narrow exterior fascia which is chain-like and broken posteriorly. *Hindwing* with the following olive-fuscous markings bordered with a deeper fuscous, and then obsoletely with glaucous and whitish:—five basal spots, an irregular small fascia posteriorly interrupted and joined to a wavy discal fascia, also a deeper fuscous wavy and dentated exterior striga bordered on all sides with paler atoms, and another submarginal striga formed of lunules, and three anal lunules distinct from these black, and powdered with metallic green. FEMALE, UPPERSIDE, *both wings* of a paler tint than in the male, with the costal and exterior border, fuscous (the latter very narrow in the hindwing). UNDERSIDE, *both wings*, as in the male."

"A local from of the *A. centaurus*, Fabricius, of Continental India, it differs very constantly from this, as also from the Javan *A. pseudocentaurus*, Doubleday, in the colouring of the macular bands of the underside of the hindwing. It recedes also from the former in the blunter apex and in the moderately straight exterior margin of the forewing." (*Felder*, l. c. in Reise Novara).

The prominence and shade of colour of all the markings on the underside in all forms of *A. centaurus* being extremely variable, no species or local race can be based on those characters alone.

anal angle. FEMALE. UPPERSIDE, *both wings* purplish-blue, merging to greyish-blue at the base; marginal bands broad. UNDERSIDE, *both wings* as in the male."

"Is nearest allied to the Javan *N.* [=*A.*] *pseudocentaurus*, Doubleday, and is quite distinct from both the Indian *N. centaurus*, Fabricius [at this date Mr. Moore had not realized that the true *centaurus* and *nakula* are one species, nor discriminated his N.-E. Indian species *A. pirithous*], and the Malayan *N. nakula*, Felder."

"LARVA elongated, oval, depressed, anterior segment scutate; finely pilose along the sides; colour green, with dorsal and lateral reddish marks, and an intervening subdorsal slender black line. Feeds on *Schleichera trijuga*. PUPA green; dorsal segments reddish." (*Moore*, l. c.)

This local race is confined to South India and Ceylon. It is a very much better species than *A. pirithous*, Moore, as both sexes can be discriminated by their brilliant blue (not dull purple) colour on the upperside. In Ceylon it occurs at "Kandy and Galle. Common; but settles rather high" (*Wade*). "Colombo, and low country" (*Mackwood*). It occurs also in the Nilgiris, North Canara, and Travancore.

Local race *coruscans*, Wood-Mason and de Nicéville. DESCRIPTION: "MALE and FEMALE. UPPERSIDE, *both wings* with the base, but especially in the female, lighter, with a greenish tinge, so that the whole medial portion appears brilliantly illuminated by a pale greenish-blue reflection in most lights." (*Wood-Mason* and *de Nicéville*, l. c.)

This local race is confined to the South Andaman Isles, where it appears to be fairly common. The male may be known from *A. pirama* on the upperside by its more brilliant and lighter blue coloration, and in the female the brilliant basal blue portion is lighter and also better defined from the darker deep blue portion beyond.

There is yet another local form, the *A. pseudocentaurus* of Doubleday, described fully by Dr. Horsfield under the name of *centaurus*, Fabricius. As it occurs in Java only, I do not give a description of it. It appears to come near to the local races *pirama* and *coruscans*.

To sum up. *A. centaurus* is one of the commonest species of the genus where it occurs (at low elevations in Sikkim it may be disturbed in great numbers by shaking the lower branches of Sal trees), and is also one of the widest-spread. On the underside it is apparently variable wherever it occurs, the ground-colour in some examples is very pale, the dark markings standing out conspicuously, in others the ground-colour is dark, and the markings are consequently obscure. The presence of the irrorated green scales at the anal angle is very variable: in some specimens there is a large patch of these scales, in other examples such scales are entirely wanting. The species has developed several local races, which are of different value, *pseudocentaurus*, *coruscans*, and *pirama* forming one group, the true *centaurus* and *pirithous* another.

787. **Arhopala agnis**, Felder.

A. agnis, Felder, Reise Novara, Lep., vol. ii, p. 228, n. 252 (1865); id., Staudinger, Ex. Schmett., p. 281, pl. xcvi, *male* (1888); *Amblypodia agnis*, Hewitson, Ill. Diurn. Lep., p. 14a, n. 74 (1869); *Narathura agnis*, Distant, Rhop. Malay., p. 262, n. 2, pl. xxi, fig. 29, *female* (1885); *Amblypodia anarte*, Hewitson, Ill. Diurn. Lep., p. 4, n. 8, pl. 1, figs. 6, 7, *female* (1863).

HABITAT: Malacca interior (*Felder*), Sumatra (*Hewitson*), Malacca, Perak (*Distant*), Mergui, Upper Tenasserim (*Doherty*).

EXPANSE: ♂, 2·00 to 2·40; ♀, 2·35 to 2·45 inches.

DESCRIPTION: "MALE. UPPERSIDE, *both wings* brilliant violet-blue, very narrowly blackish-fuscous along the margins. *Hindwing* darkening with blackish along the interior margin, *tail* with a white tip. UNDERSIDE, *both wings* pale brownish, with a double series of whitish, narrow, exterior lunules. *Forewing* pale on the interior third of the surface, and with the following markings of a little deeper tint than the ground-colour, and margined with whitish:— two annular marks in the cell, a spot at the end of the cell, another above the origin of the first median nervule, and a narrow, exterior, chain-like fascia, formed of six spots, and twice broken. *Hindwing* with the following markings of a little deeper tint than the ground-

colour, margined with whitish-brown, and all well-separated one from the other :—six annular spots, three basal, two subbasal, and one internal, a small disco-cellular fascia, a spot below it, and an exterior fascia, which is chain-like anteriorly, interrupted at the second subcostal nervule, and posteriorly broken and bent upwards ; there are also three black anal spots, the first and third bordered inwardly with metallic blue, the middle one overlaid with atoms of this colour." (*Felder*, l. c.) " FEMALE. UPPERSIDE, *both wings* violaceous-blue, costal and outer margins broadly fuscous. [*Hindwing* with the abdominal margin broadly whitish.] UNDERSIDE, *both wings* pale brownish, with the following spots and fasciæ margined with greyish :—*forewing* with two spots in the cell and one at the end of the cell, two spots beneath the cell divided by the first median nervule, a somewhat curved macular fascia between the end of the cell and the outer margin commencing near the costa and terminating at the first median nervule, and a more obscure submarginal fascia. *Hindwing* with about seven basal spots, a subquadrate spot at the end of the cell continued as a macular fascia to the abdominal margin, an outer discal macular fascia which becomes duplex near the anal angle, and a somewhat obscure submarginal fascia ; three transverse, marginal, metallic greenish streaks, the innermost with a black spot near the anal angle (*two of these are rubbed or obliterated in the specimen figured*) ; *tail* with the apex greyish-white. *Body* above more or less concolorous with the wings, beneath more or less greyish ; *legs* pale brownish. " (*Distant*, l. c.)

" Our single male is most closely allied to the insect which Hewitson (Ill. Diurn. Lep., p. 4, n. 8, pl. i, figs. 6, 7, *female*) figures as the female of his *A. anarte*, but it is safe to separate it owing to the smaller spots of the underside, and the two uppermost ocelli on that side fully separated from the fascia of the hindwing."

"Of the true *A. anarte*, Hewitson, we received also a male from Count Castelnau from the interior of Malacca." (*Felder*, l. c.)

"It is evidently a much rarer insect than *N.* [=*A.*] *centaurus*, Fabricius, or at least more seldom met with by collectors. Mr. Kirby has placed *N. agnis* as a synonym of the Sumatran species, *N. anarte*, Hewitson, but it is sufficiently distinct for specific separation." (*Distant*, l. c.) With reference to this remark, the true *A. anarte* of Hewitson, described without locality, is of course distinct, but the female example Mr. Hewitson figured under that name is undoubtedly the female of *A. agnis*, as pointed out by Hewitson himself, and it occurs in Sumatra, according to that writer.

Neither Felder nor Distant describe all the spots which are found on the underside of this species. In the six specimens I have seen, three males and three females, two have a small spot above and attached to the spot in the middle of the cell of the forewing on the underside, two specimens have a small spot above the subcostal nervure between the spot in the middle of the cell and the spot closing the cell, and two specimens possess a small spot on the costa above the spot closing the cell ; the discal series consists of seven spots, the uppermost at the costa out of line, shifted towards the base of the wing. In the hindwing there are four subbasal spots in a curved series, then three larger spots beyond in a straight line, a large spot closing the cell, and a small one below it at the base of the first median interspace ; the discal series is particularly regular, it consists of six annular spots arranged in pairs, then a lengthened hook-shaped spot reaching the abdominal margin.

In the Indian Museum, Calcutta, are a pair of this species from Perak, and I possess a single female taken in the Thoungyeen Forests, Upper Tenasserim, in March, by Major C. T. Bingham. The coloration of this specimen is much more blue on the upperside than the Perak female, but it does not otherwise differ. Mr. Doherty took it at Mergui.

788. Arhopala silhetensis, Hewitson.

Amblypodia silhetensis, Hewitson, Cat. *Lycænidæ* B. M., p. 7, n. 31, pl. iv, figs. 27, 28, *male* (1862).
HABITAT : Sylhet (*Hewitson*) ; Sikkim Dooars.
EXPANSE : ♂, ♀, 2·1 inches.

Description : Male. Upperside, *both wings* bluish-purple. *Forewing* with the outer margin narrowly black. *Hindwing* with the costa and apex widely, and the outer margin less widely, black, the abdominal margin pale. Underside, *both wings* dull brown, the markings darker brown with pale edges. *Forewing* with the inner margin broadly paler ; a rather small round spot near the base of the cell, a larger oval spot across its middle, a still larger somewhat quadrate spot closing the cell, with a small round spot on the costa above it ; a discal catenulated band of seven spots arranged in echelon, the first group consisting of four spots trending obliquely outwards, the second spot from the costa of these four larger than the spot on either side of it, the fourth spot larger than the third but not as large as the second ; the next group of two spots divided by the second median nervule shifted inwards ; the last group consisting of a single spot in the submedian interspace also shifted inwards ; a rather prominent submarginal and obscure marginal fasciæ. *Hindwing* with a double series of subbasal spots, the inner series of four, the outer of three spots ; the usual bifurcating irregular catenulated band across the disc ; submarginal and marginal very obscure fasciæ ; the inner portion of the submarginal fascia sprinkled with dull metallic green scales ; the anal lobe large, bearing a prominent large deep black spot, with some dull metallic green scales on the margin beyond, an elongated black spot on the margin in the first median interspace slightly sprinkled with green scales ; *tail* black above, brown below, tipped with white. Female. Upperside, *both wings* of a brighter and lighter blue colour than in the male. *Forewing* with the costa and outer margin broadly, the apex very broadly black, the blue colour occupying about two-thirds of the area of the wing. *Hindwing* with the blue area occupying about half the wing, confined to the disc and base, the rest of the wing black. Underside, *both wings* as in the male.

Apparently one of the rarest species of the genus. Hewitson recorded it from Sylhet ; in the Indian Museum, Calcutta, is a single female from that locality. I possess a male from Jalpaiguri. These are the only specimens known to me. The female very closely resembles the female of *A. eumolphus*, Cramer (= *A. bupola*, Hewitson), but may be known by the greater extent of the blue coloration on the upperside, by the more rufous ground-colour of the underside entirely lacking the silky gloss which is one of the characteristics of that species, and by the anal lobe to the hindwing being fully twice as large.

789. **Arhopala adorea,** n. sp. (Frontispiece, Fig. 139 ♂).

Habitat : Sikkim ; Khasi Hills ; Tenasserim Valley, Burma ; Singapore.

Expanse : ♂, 2·0 to 2·2 ; ♀, 2·2 inches.

Description : Male. Upperside, *both wings* deep bluish-purple. *Forewing* with the costa and outer margin narrowly black. *Hindwing* with the costa broadly black, the outer margin a little more broadly black than in the forewing, the abdominal margin pale ; the anal lobe black, crowned with a pure white spot Underside, *both wings* dull brown, all the spots and bands of a darker shade of brown than the ground, outwardly defined with grey. *Forewing* with three prominent increasing spots in the cell ; a costal spot above the disco-cellular spot ; two large spots beneath the median nervure divided by the first median nervule ; a discal series of seven spots, the four uppermost forming a curved compact band, the two next divided by the second median nervule shifted inwardly from the line of the rest, the lowest spot in the submedian interspace large, placed obliquely outwards ; a rather prominent dark submarginal macular band outwardly defined with grey. *Hindwing* with the spots and bands as usual ; the anal lobe with a large intensely black spot, the anal area more broadly overlaid with metallic green scales than usual ; *tail* black, tipped with white. Female. Upperside, *both wings* of a lighter shade of purple than in the male. *Forewing* with the costa and outer margin broadly black. *Hindwing* with the costal, outer, and abdominal margins broadly black. Underside, *both wings* like the male.

The male of *A. adorea* differs from that sex of *A. adatha*, Hewitson (Cat. *Lycænidæ* B. M., pl. iv, figs. 29, 30) in being rather larger, in the outer black border on the upperside

of both wings being quite half as wide, the underside brown not rufous, with an additional costal spot in the forewing. It differs from fig. 31 (l. c.) of *A. adatha* on the underside in being brown not rufous, and in having the discal band in the forewing broken, less broad, and more macular. Mr. Hewitson gives Amboyna and Singapore as the habitat of *A. adatha*, but as his figures in my opinion represent two distinct species, and he does not say which figure represents the Amboyna or which the Singapore specimen, I am unable, not having access to the types, to say which of these figures represents the true *A. adatha*. (For further remarks on this species, see page 247). *A. adorea* is also closely allied to *A. silhetensis*, Hewitson, from which the male differs in having the outer margin of the forewing very convex instead of straight, the hindwing posteriorly rounded, instead of much elongated as in *A. silhetensis* ; the blue coloration of the upperside of the male also is richer and deeper, and the second spot of the discal series on the underside of the forewing no larger than the spot above and below it, while in *A. silhetensis* it is produced outwardly far beyond the line of the others.

Described from three males and one female from Singapore obtained by Mr. W. Davison. I have also seen a male from the Tenasserim Valley, Burma, collected by Mr. W. Doherty, and there are single males from Sikkim and the Khasi Hills in my collection.

The figure shews both sides of the type male specimen from Singapore in the collection of the Raffles Museum, Singapore.

790. **Arhopala yendava,** Grose Smith.

Amblypodia yendava, Grose Smith, Ann. and Mag. of Nat. Hist., fifth series, vol. xix, p. 297 (1887).

HABITAT : Yendaw, Burma.

EXPANSE : ♂, ♀, 2·25 inches.

DESCRIPTION : "MALE. UPPERSIDE, *both wings* lilac-blue, margins broadly dark brown. UNDERSIDE, *both wings* brown. *Forewing* with a spot on the middle of the costa ; a transverse band of six spots, the first four curving outwards, the fifth further from the outer margin, the sixth in a line with the fourth ; two spots in and one at the end of the cell, and a submarginal indistinct band. *Hindwing* with ten basal spots and a medial band of spots, of which the first two are distinct, the next four confluent, the seventh angulated, and the eighth on the inner margin elongated ; a submarginal indistinct band ; a black spot at the anal angle, above which and on each side of the tail is an irroration of silvery greenish-blue. FEMALE. UPPERSIDE, *both wings* violet-blue."

"Near to *A. atosia*, [Hewitson, Ill. Diurn. Lep., p. 9, n. 37, pl. ii, figs. 8, 9, *female*, from Sumatra], but much larger, and the arrangement of the spots on the underside is quite different." (*Grose Smith*, l. c.)

I have not seen this species, which appears to be distinct. It is of large size, the sexes alike except that the male is lilac-blue, the female violet-blue on the upperside. There may be a mistake in the description, as both sexes appear to have an equally wide outer black margin on the upperside of both wings, which as far as I know occurs in no other species of this group. On the underside no mention is made of the two spots below the cell of the forewing which are divided by the first median nervule and are almost always present.

791. **Arhopala amantes,** Hewitson.

Amblypodia amantes, Hewitson, Cat. *Lycænidæ* B. M., p. 4, n. 17, pl. ii, figs. 2, 3, *male* ; 1, *female* (1862) ; *Arhopala amantes*, Wood-Mason and de Nicéville, Journ. A. S. B., vol. l, pt. 2, p. 250, n. 76 (1881) ; *Nilasera amantes*, Moore, Lep. Cey., vol. i, p. 115, pl. xliv, figs. 2a, 2b, *male* ; 2, *female* ; 2c, *larva* and *pupæ* (1881) ; *Nilasera apella*, Swinhoe, Proc. Zool. Soc. Lond., 1886, p. 429, n. 64, pl. xl, fig. 4, *male*.

HABITAT : India, Ceylon, Burma, South Andaman Isles, Makassar.

EXPANSE : ♂, ♀, 2·2 to 2·5 inches.

DESCRIPTION : "MALE. UPPERSIDE, *both wings* brilliant morpho-blue, the costal and outer margins with a narrow border of black. UNDERSIDE, *both wings* grey, the spots and bands rufous-brown. *Forewing* with the transverse band broken, the middle spot projecting outwards. *Hindwing* with the medial band having two branches composed of unequal angular spots, the anal angle irrorated with light green. FEMALE like the male,

except that the blue of the UPPERSIDE of *both wings* is confined to half the wing, with the margins very broad."

"Variety *a*, from Makassar. FEMALE. UPPERSIDE, *both wings* with the blue colour lighter, occupying a still smaller space than the above-described typical form." (*Hewitson*, l. c.)

"Larva elongated, oval, depressed at the ends, anterior segment scutate, with a lateral row of fine short hair; green, with two subdorsal reddish lines, a red patch on the second and last segments, the interdosal space marked with blackish spots and lines; a lateral row of spots." Food-plant not recorded. "PUPA broad, thorax convex, head slightly produced; thorax and wing-cases greenish, abdomen reddish." (*Moore*, l. c.)

There is not much difference in the shade of blue on the upperside of the males of *A. amantes* and *A. centaurus*, local race *pirama*; but the former is rather deeper and richer. There is more difference in the females, the female of *A. amantes* being almost uniform throughout, while in *A. pirama* the bases of the wings are considerably lighter. The markings of the underside are also very similar, though, as pointed out by Mr. Hewitson, the fourth spot of the discal band of the forewing in *A. amantes* is usually out of line, and nearer to the margin than the other spots forming the band. The spots in the cell of the forewing are usually smaller, and, as in *A. centaurus*, usually marked anteriorly with white or greenish. The distinguishing character of the species, however, is the presence of a well-formed anal lobe to the hindwing, which on the underside is usually centred with deep black; *A. centaurus* entirely lacks this lobe. The colour of the ground of the underside and the prominence of the markings are perhaps even more variable in *A. amantes* than they are in *A. centaurus*.

In India, *A. amantes* is more widely spread than *A. centaurus*. It occurs all along the foot of the Himalayas from the Dehra Dun to Sikkim, in the plains of Bengal, the Central Provinces, and in Bombay, and thence southwards to Travancore and Ceylon; in the latter island it is found at "Colombo. Shrubby parts of cinnamon gardens, about May to end of June. Flight strong, rapid; conceals itself under leaves with wings always folded" (*Hutchison*). "Common at Colombo" (*Wade*). "Colombo. Cinnamon gardens and low country generally, fond of resting on the leaves of the Mango-tree" (*Mackwood*). In May, 1882, I took a single male specimen in Calcutta under the big banian tree in the Botanical Gardens. Mr. E. H. Aitken writes of it in Bombay as follows:—"*N. amantes*, Hewitson, is not common, and I am not sure of the limits of its season. I have seen it oftener about the beginning of June than at any other time, and oftener at Karanja across the Bombay Harbour than at any other place. It flies very fast." (*Aitken*, Journ. Bombay Nat. Hist. Soc., vol. i, p. 217, n. 48 (1886). I possess a single female specimen from Moulmein, Burma, which differs from the typical form in that the anal lobe on the underside of the hindwing is centred with reddish-brown instead of deep black, the blue coloration of the forewing on the upperside extends well above the discoidal cell nearly reaching the costa and beyond the cell also, in the hindwing it is more restricted to the base. The single example I have seen from the Andamans differs a good deal from the typical form: it is smaller, the area of the blue coloration of the upperside is rather different, all the markings below are smaller, more compact and prominent. It probably represents a new species, but I prefer not to name it till I possess larger material. I append a description of *Arhopala apella*, Swinhoe, a species which is strictly synonymic with *A. amantes*.* I have examined a "co-type" male example from Mhow in Colonel Swinhoe's collection.

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* *Arhopala apella*, Swinhoe. *Nilasera apella*, Swinhoe, Proc. Zool. Soc. Lond., 1885, p. 429, n. 64, pl. xl, fig. 4, *male*. HABITAT: Mhow, March. EXPANSE: 2·1 inches. DESCRIPTION: "Allied to *N.* [=*A.*] *amantes*, Hewitson. UPPERSIDE of a brighter and paler blue, but similar to *A. amantes* in the deep costal band on the forewing of the male, which is absent in the female, and in the far deeper costal band of the hindwing and marginal band of both wings UNDERSIDE quite different, the ground-colour being of a uniform pale brownish grey with an ochreous tinge, this tinge showing quite distinctly on the brown portions of the forewing, the costal portion and much of the hindwing being silvery-grey. *Forewing* with one small spot in the cell near the base, and a larger one also within the cell, a little forward of its middle, the upper portions of both touching the subcostal nervure; another spot, square and larger at the end of the cell, and a smaller one below this in the angle of the first median interspace. and below this is a spot elongated into a band running along the interspace for more than half its length below the first median nervule, and half filling up that portion of the interno-median interspace; there is also a discal row of six confluent spots from the

792. **Arhopala vihara**, Felder.

Amblypodia vihara, Felder, Wien. Ent. Monatsch., vol. iv, p. 395, n. 5 (1860) ; id., Kheil, Rhop. der Insel Nias, p. 33, n. 122 (1884) ; *Arhopala vihara*, Felder, Reise Nov., Lep., vol. ii, p. 228, n. 253, pl. xxix, fig. 7 (1865) ; id., Moore, Proc. Zool. Soc. Lond., 1878, p. .835 ; *Narathura vihara*, Distant, Rhop. Malay., p. 270, n. 16, woodcut n. 83 (1885).

HABITAT : Taoo, Upper Tenasserim, 3,000-5,000 feet (*Moore*) ; Malacca interior (*Felder*) ; Nias Island (*Kheil*).

EXPANSE : 2·0 inches.

DESCRIPTION : " MALE. UPPERSIDE, *both wings* deep violet-blue. *Forewing* with a blackish-fuscous costal margin rather broader exteriorly. *Hindwing* with a fuscous costal border passing on into a broadish exterior border increasing in width, and with the interior border also fuscous. UNDERSIDE, *both wings* light fuscous, with a submarginal fascia common to both. *Forewing* with a pair of annular spots within the cell, of a deeper tint than the ground-colour, a disco-cellular spot, two spots below the median nervure, a chain-like exterior fascia ending at the first median nervule and broken at the third median nervule. *Hindwing* with five annular basal spots of a deeper tint than the ground-colour, a sixth spot internal, a small discoidal fascia in three pieces, an exterior chain-like fascia broken at the second subcostal nurvule close to the small fascia, bent upwards posteriorly and continuous ; all these markings fuscous and margined with a much paler tint. *Forewing* with the internal third of its surface pale. *Hindwing* with three black anal spots increasing in size, the middle spot entirely, the other two only inwardly sprinkled with metallic blue. FEMALE. UPPERSIDE, *both wings* of a paler tint than those in the male. *Forewing*, with a sinuous costal margin, and a broad exterior margin fuscous. *Hindwing* with the costal border passing on into the exterior border of the same colour, the interior margin paler brown. UNDERSIDE, *both wings* altogether as in the male."

" Strikingly different from the above-described species [*A. agnis*, Felder] in the much darker and moderately broad-bordered upperside of the male. The forewing is blunter and the hindwing shorter and more produced at the apex than in *A. agnis*, Felder." (*Felder*, l. c. in Reise Novara.)

I have not seen this species, nor has Mr. Distant obtained it from the Malay Peninsula. Unfortunately, no figure has been given of the upperside of the male, and it is impossible to gather from the description alone what is the width of the black border. The underside has been figured, and appears to agree very closely with that of *A. agnis*, Felder. The distinctive characters of *A. vihara*, as compared with *A. agnis*, appear to be its rather smaller size, the deep instead of brilliant violet-blue of the upperside of the male ; the uncertain width of the black outer border, which is so narrow in *A. agnis* that it can hardly be said to exist, hardly extending inwardly beyond the cilia. *A. vihara* is still nearer to *A. amantes*, Hewitson, from which it may be known by the discal band on the underside of the hindwing being anteriorly split up into three pairs of spots, instead of being continuous.

793. **Arhopala atosia**, Hewitson. (FRONTISPIECE, FIG. 138 ♂).

Amblypodia atosia, Hewitson, Ill. Diurn. Lep., p. 9, n. 37, pl. ii, figs. 8, 9, *female* (1863) ; id., Druce, Proc. Zool. Soc. Lond., 1873, p. 353, n. 4 ; id., Butler, Trans. Linn. Soc. Lond., Zoology, second series, vol. i, p. 548, n. 5 (1877) ; *Narathura atosia*, Distant, Rhop. Malay., p. 265, n. 7, pl. xxiii, figs. 6, *male* ; 5 *female* (1885).

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costa, commencing with a small one and getting gradually larger and ending on the first median nervule at the end of the band ; all the spots brown, surrounded with yellowish-white, the white borders being clearest round the two spots in the cell and the two outside it. *Hindwing* with four or five brown spots near the base, a central whirl [? whorl] of spots of the same colour, disconnected, and irregular like a zigzag band, a discal whorl of similar spots but paler, and the space on each side filled in with other bands of spots so pale as to be only here and there visible ; a black spot at the anal angle, and a white silvery streak on the margin running from this spot to the first median nervule, and clouded with dark brown atoms. *Tails* black, tips white." *Both wings* with the margins brown, diffused inwardly. (*Swinhoe*, l. c.)

Colonel Swinhoe describes the male of his *A. apella* as having a deep costal band on the upperside of the forewing. This is incorrect, the description applies to the female, and he has evidently reversed the sexes. The shade of colour on the underside is not a specific character, in both *A. centaurus* and *A. amantes* it is extremely variable, the dark-coloured specimens coming from districts of heavy rainfall or are seasonal forms occurring in the rains ; the light coloured examples occur in dry localities or during the dry season.

HABITAT: Sumatra (*Hewitson*), Borneo (*Druce*), Malacca (*Butler*), Mergui, Tenasserim Valley, Burma.

EXPANSE: ♂, ♀, 1·7 to 2·0 inches.

DESCRIPTION: "MALE. UPPERSIDE, *both wings* lilac-blue, the margins black, very narrow. *Forewing* with a large medial spot of a somewhat different colour, not seen except in a certain light, and not produced by any unusual arrangement of the scales. UNDERSIDE, *both wings* rufous-brown. *Forewing* with the transverse band broken, composed of seven parts, three together, the fourth projecting outwardly from the rest, the three following further from the margin than the fourth. FEMALE. UPPERSIDE, *both wings* violet-blue. *Forewing* with the costal margin, the apex, and the outer margin broadly black, the veins black. *Hindwing* with the apex and outer margin broadly dark brown, the veins black."

"The spots on the underside of the male are less distinctly marked than those of the female. This species scarcely differs on the underside from *A. adonias* [Hewitson, from Java], and *A. eumolphus*, Cramer. It is nearly allied to *A. agaba*, Hewitson; on the upperside the two species are alike." (*Hewitson*, l. c.)

Mr. Distant did not obtain this species in the Malay Peninsula, but he figures the opposite sexes from specimens from Malacca contained in the British Museum. These figures shew the male with a very broad outer black margin to both wings on the upperside. This is almost certainly incorrect, and either two varietal female forms of this species, or females of two different species, have been figured; Hewitson distinctly says that the margins are very narrowly black in the male; in one place that *A. atosia* is the same on the upperside as *A. agaba*; and in another describes a medial spot of a different colour from the rest of the wings on the upperside of the forewing in the male*; this spot is certainly not present in *A. agaba*. *A. atosia* in both sexes may, however, be easily known from *A. agaba* by having the discal band on the underside of the forewing in both sexes broken below the fourth spot from the costa, and by the fourth spot being nearer the margin than the rest; in *A. agaba* the band is nearly straight, unbroken, all the spots one below the other. Herr P. C. T. Snellen (Midden-Sumatra, Lepidoptera, p. 21) appears to consider that *A. atosia* is a variety of the female of *A. eumolphus*, Cramer. In this, however, I think, he is incorrect. Hewitson describes both sexes of *A. atosia*, and figures the female which from the figure may at once be distinguished from the female of *A. eumolphus* by having the purple area on the upperside of much greater extent.

I have received two male and three female specimens of this species from Singapore, kindly sent me by Mr. W. Davison, and have also seen two males and three females collected in Mergui and the Tenasserim Valley, Burma, by Mr. Doherty. They agree in coloration and markings in both sexes almost exactly with the species I identify as *A. antimuta*, Felder; they are also of about the same size, but may be known by having a tail, which *A. antimuta* lacks. In the male the outer black border is half as wide on the upperside as in *A. antimuta*.

The figure shews both sides of a male specimen from Singapore in my collection.

794. **Arhopala abseus**, Hewitson.

Amblypodia abseus, Hewitson, Cat. *Lycænidæ* B. M., p. 9, n. 40, pl. v, figs. 41, 42 (if corrected in MS., then figs. 51, 52), *female* (1862); idem, id., Ill. Diurn. Lep., p. 10, n. 44 (1863); id., Druce, Proc. Zool. Soc. Lond., 1873, p. 353, n. 6; *Satadra absens*, Moore, Journ. A. S. B., vol. liii, pt. 2, p. 41 (1884).

HABITAT: Sylhet, Singapore (*Hewitson*), Borneo (*Druce*), Sikkim, Burma.

EXPANSE: ♂, ♀, 1·4 to 1·5 inches.

DESCRIPTION: "FEMALE. UPPERSIDE, *both wings* bright blue, the margins broadly brown. UNDERSIDE, *both wings* ferruginous. *Forewing* with a broad transverse band in the middle, the usual band nearer the apex, at first broad and of equal breadth, then broken nearly apart in the middle and projected towards the margin, the lower part becoming narrower to its lower extremity. *Hindwing* lilac in the middle, with a light spot on the middle of the costal margin." (*Hewitson*, l. c. in Cat. *Lycænidæ* B. M.)

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* This very curious feature is only found in one other species, as far as I know, the *A. antimuta* of Felder.

"Most of the examples of this species have a nearly white spot on the middle of the costal margin on the underside of the hindwing as in *A. ammon*, Hewitson." (*Hewitson*, l. c. in Ill. Diurn. Lep.) MALE. UPPERSIDE, *both wings* differ from the female only in the coloration of the disc being rather deeper in shade, more purple than blue.

A common species in Sikkim, occurring in June, July, October, and December. Hewitson recorded it from Sylhet, but I have seen no specimen from there, though it is more than probable that it occurs throughout Assam. Dr. J. Anderson obtained it at Yimiki, King Island, Mergui Archipelago, in February ; Captain C. H. E Adamson has sent me a single female taken in May at Tsenbo, Upper Burma ; and Mr. Doherty obtained specimens at Myitta in the Tenasserim Valley in the cold weather, which he notes as agreeing perfectly with Sikkim examples. Although Mr. Hewitson recorded it from Singapore, Mr. Distant does not include it in his "Rhopalacera Malayana." *A. abseus* cannot be mistaken for any other, the broad band at the end of the cell from the costa to the first median nervule on the underside of the forewing, and the prominent whitish quadrate patch on the middle of the costa of the hindwing being unique characters. In addition to the long tail at the termination of the first median nervule, there is a short one at the termination of the second median nervule, and another at the termination of the submedian nervure. The shape of the hindwing is also unusual, the costa being very straight, and the apex acute. There is hardly any difference between the sexes.

795. **Arhopala ammon,** Hewitson.

Amblypodia ammon, Hewitson, Cat. *Lycænidæ* B. M., p. 9, n. 41, pl. v, figs. 49, 50, *female* (1862); *Narathura ammon*, Distant, Rhop. Malay., p. 272, n. 19, woodcut n. 83, *female* (1885).

HABITAT: Singapore (*Hewitson*); Myitta, Tenasserim Valley, Burma.

EXPANSE: ♂, 1·2 ; ♀, 1·3 inches.

DESCRIPTION: "MALE. UPPERSIDE, *both wings* lilac-blue, the margins with a narrow border of black. UNDERSIDE, *both wings* rufous and lilac-grey. *Forewing* with the band broken, the middle spot projecting outwards. *Hindwing* without a transverse band, with a white spot on the middle of the costal margin, the black spots at the anal angle irrorated with silvery-blue. FEMALE. UPPERSIDE, *both wings* like the male, except that the margins are much broader." UNDERSIDE, *both wings* like the male. (*Hewitson*, l. c.)

Mr. Distant did not obtain this species in the Malay Peninsula, so probably the type specimens were the only ones known until lately, when Mr. Doherty obtained two males in the Tenasserim Valley, Burma. It is a little smaller than *A. abseus*, Hewitson, both sexes differing from that species in having more blue coloration on the upperside and a single tail to the hindwing. On the underside it superficially resembles *A. abseus* in possessing a prominent white spot on the middle of the costa of the hindwing, but all the other markings are a good deal different, being more annular. Mr. Doherty's specimens are undoubtedly males, and have the outer black borders on the upperside of both wings as broad as in Hewitson's figure, which is stated to be that of a female. Mr. Hewitson notes that the male of *A. ammon* has these borders much narrower than in the female. There is evidently some confusion regarding the species ; it may hereafter be found that the Burmese form represents a species distinct from that from Singapore.

796. **Arhopala ænea,** Hewitson.

Amblypodia ænea, Hewitson, Ill. Diurn. Lep., p. 14*e*, n. 87, pl. iii*c*, fig. 55, *male* (1869).

HABITAT: Sikkim, Khasi Hills.

EXPANSE: ♂, ♀, 1·55 to 1·80 inches.

DESCRIPTION: "MALE. UPPERSIDE, *both wings* violet-blue, the margins dark brown, narrow. UNDERSIDE, *both wings* rufous, with several very indistinct bands of a slightly darker colour. *Forewing* with the transverse band unbroken, and of equal breadth." (*Hewitson*, l. c.) FEMALE. UPPERSIDE, *both wings* black. *Forewing* with the purple coloration of a much lighter shade than in the male, and much more restricted in extent. *Hindwing* with a small patch of purple in the middle of the disc. UNDERSIDE, *both wings* as in the male

The markings and coloration of the underside of both sexes of this species are very distinctive; the ground-colour is reddish-brown, and all the spots and bands are very obscure. The forewing has a very small spot near the base of the cell, a larger transverse one in the middle, and a still larger one closing the cell, a narrow discal unbroken band, and a submarginal more obscure band, all of a slightly darker shade than the ground, and outlined paler. There is usually a very small but prominent black spot near the costal base of the hindwing, but, with this exception, all the other markings are obscure, as in the forewing; a patch of metallic blue scales is rarely present at the anal angle.

A rare species in Sikkim; Mr. Otto Möller has specimens taken in October and November. The Revd. Walter A. Hamilton has obtained it in profusion in the Khasi Hills.

797. Arhopala agaba, Hewitson.

Amblypodia agaba, Hewitson, Cat. *Lycænidæ* B. M., p. 8, n. 39, pl. iv, figs. 39, 40, *female* (1862); *Satadra agaba*, Moore, Journ. A. S. B., vol. liii, pt. 2, p. 38 (1884); id., Elwes and de Nicéville, Journ. A. S. B., vol. lv, pt. 2, p. 430, n. 104 (1885).

HABITAT: India (*Hewitson*), Mergui Archipelago, Upper Tenasserim, Tavoy.

EXPANSE: ♂, 1·65 to 1·80; ♀, 1·65 to 1·80 inches.

DESCRIPTION: "FEMALE. UPPERSIDE, *both wings* bright blue, with the margins broadly black. UNDERSIDE, *both wings* lilac-grey, the spots dark red-brown. *Forewing* with the transverse band long, nearly equal in breadth, except at the extremities, formed of seven spots. *Hindwing* with two branches, the inner branch becoming obscure beyond the middle, the anal angle irrorated with white." (*Hewitson*, l. c.) "MALE. UPPERSIDE, *both wings* differ from those of the female only in being purple rather than bright blue, the outer margins narrowly and evenly, instead of broadly, black. UNDERSIDE, *both wings* like the female." (*Elwes* and *de Nicéville*, l. c.)

This species is very brilliantly glossed with purple on the underside. In the forewing there are three increasing spots in the cell, one on the costa above the spot closing the cell, one below the cell at the base of the first median interspace, and a discal band as described above. The hindwing has four basal spots, a spot below the costal nervure, another in the middle of the cell, the discal band bifurcated, the inner bifurcation consisting of three spots, one closing the cell, and two divided by the second median nervule; a prominent black spot on the anal lobe, beyond which the margin is sprinkled with metallic green not white scales, as stated by Hewitson.

In the Phayre Museum, Rangoon, is a male taken at Rangoon in March, in the Indian Museum, Calcutta, a female taken at Mergui on 22nd March, 1882, by Dr. J. Anderson, also a male from Tavoy obtained by the Museum Collector, Moti Ram. I possess two males from the Thoungyeen forests taken in March, and one from the Upper Thoungyeen forests taken in April, by Major C. T. Bingham. This species should be easily recognisable. It is perhaps nearest to *A. selta*, Hewitson, but the male on the upperside is of a much deeper shade of purple, the outer black margins narrower, the discal band of the forewing on the underside also narrower, and less regular and continuous.

I give as a foot-note* a description of *A. aroa*, Hewitson, originally described from Sumatra, and identified from Malacca by Mr. Butler. I also identify the species, but with considerable doubt, from Singapore, it being extremely difficult in many cases to identify with certainty species of this genus without having access to the type specimens or at any rate without specimens from the habitat of the type.

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* *Arhopala aroa*, Hewitson. *Amblypodia aroa*, Hewitson, Ill. Diurn. Lep., p. 13, n. 60, pl. ii, fig. 12, *male* (1863); id., Butler, Trans. Linn. Soc. Lond., Zoology, second series, vol. i, p. 548, n. 9 (1877); *Narathura aroa*, Distant, Rhop. Malay., p. 266, n. 9, pl. xxiii, fig. 17, *male* (1885). HABITAT: Sumatra (*Hewitson*), Malacca (*Butler*). EXPANSE: *Male* 1·7 inches. DESCRIPTION: "MALE. UPPERSIDE, *both wings* violet-blue: the margins *very narrow*, black. UNDERSIDE, *both wings* rufous-brown. FOREWING with the band of nearly equal breadth, slightly curved."

"*A. aroa* is very nearly allied to *A. hypomuta*, Hewitson, the blue of its upperside is less brilliant, and the spots and bands of the underside appear to be much wider apart. *A. hypomuta* seems, on the hindwing, as if covered throughout with spots, the spaces between the bands and spots having nearly the same appearance as the usual spots and bands themselves have." (*Hewitson*, l. c.)

798. **Arhopala selta,** Hewitson.

Amblypodia selta, Hewitson, Ill. Diurn. Lep., p. 14*f*, n. 92, pl. iii*a*, figs. 36, 37, *female* (1869); *Satadra selta*, Moore, Journ. A. S. B., vol. liii, pt. 2, p. 38 (1884).

HABITAT: Moulmein (*Hewitson*); Mergui Archipelago.

EXPANSE: ♀, 1·9 inches (*Hewitson*); ♂, 1·4; ♀, 1·5 inches (*Hewitson's figure*).

DESCRIPTION: FEMALE. "UPPERSIDE, *both wings* lilac-blue, with the margins broadly dark brown, darkest on the forewing. *Forewing* with a black line at the end of the cell. UNDERSIDE, *both wings* lilac, with the usual subbasal spots, and a submarginal macular band. *Forewing with a straight broad equal band* before the apex. *Hindwing* with a large quadrate spot at the middle of the costal margin, from which branch off two other bands of spots all rufous-brown, black spots on each side of the tail and at the anal angle irrorated with blue."

"Differs from *A. alea*, Hewitson, only in the very straight and much broader band before the apex of the forewing, which is, in this genus, the most prominent guide to species." (*Hewitson*, l. c.)

In the Indian Museum, Calcutta, is a single male of this species collected at Yimiki, King Island, Mergui Archipelago, by Dr. J. Anderson, on 25th February, 1882. This specimen Mr. Moore recorded* as *S. agaba*, Hewitson, though with some doubt, as he ticketed it "This is probably *agaba* ♂." It certainly is not that species, from which it differs in being smaller, of a more brilliant, more shining, and lighter purple colour on the upperside, in having the outer black margins fully three times as broad, and on the underside of the forewing the discal band much broader, not at all divided into spots, and apparently nearer the margin. It is not so strongly glossed with purple as in *A. agaba*, in which a strong purple gloss is a very prominent feature. The disposition and number of the spots on the underside is the same in *A. agaba* and *A. selta*. This species seems to be quite distinct, and should be easily recognised.

799. **Arhopala canaraica,** Moore.

Satadra canaraica, Moore, Journ. A. S. B., vol. liii, pt. 2, p. 39 (1884); id., Waterhouse, Aid, pl. clxv, figs. 5, 5*a*, *male* (1886).

HABITAT: Canara, S. India (*Moore*); Travancore.

EXPANSE: ♂, 1·37 to 1·60; ♀, 1·75 inches.

DESCRIPTION: "Allied to *S.* [=*A.*] *alea*, Hewitson. MALE and FEMALE. UPPERSIDE, *both wings* of a more purplish violet-blue than in *S. alea*, the marginal black border comparatively narrower in the male. UNDERSIDE, *both wings* of a darker purplish violet-brown. *Forewing* with the basal spots darker, the two cell-spots very small and round, the discocellular spot and the two below the cell narrower, the transverse discal band regular and not broken on the third median nervule, the submarginal and marginal lunules obsolescent. *Hindwing* with the basal and subbasal spots darker and very small, the discal zigzag band

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Mr. Distant has not received this species from the Malay Peninsula, but figures a specimen now in the British Museum, collected by Captain Pinwill in Malacca. As figured by Hewitson, the forewing has three increasing spots in the cell, a fourth minute spot on the costa above the spot closing the cell, two spots below the cell divided by the first median nervule, and a very nearly straight discal series of six nearly equal-sized spots. On the hindwing are four basal and three subbasal spots and one closing the cell, the usual irregular discal series, and a submarginal series. I think it more than probable that the Malacca specimen figured by Distant is not the true *A. aroa*, as it shows quite a wide black margin to both wings on the upperside, while Hewitson emphasises the fact that the margin is very narrow. Mr. Distant's specimen also is a good deal larger than the type.

Mr. W. Davison has sent me a long series of both sexes of a species of *Arhopala* from Singapore which I think it best to call by the name *aroa*. The male is violet-blue on the upperside, the black margins are very narrow, and the shape of the band on the underside of the forewing more or less agrees with Hewitson's description and figure of the species, but it is rather variable, being sometimes quite continuous and sometimes broken below the second median nervule; it also agree in size with the type. These specimens differ a little, however, from the figure in that the spot at the base of the first median interspace of the forewing on the underside is much nearer to the discal band than is shown in Hewitson's figure, from which it looks to me to be unnaturally widely separated. Under the circumstances, I consider it better to call my specimens *aroa* than to describe them as a "new species." In these specimens all the markings of the underside are prominent, of a darker brown than the ground and outwardly defined with grey. The female differs from the male on the upperside of both wings in having the blue coloration of a lighter, more purplish tint, the costa and outer margins of both wings and the abdominal margin of the hindwing broadly black.

* *Satadra agaba*, Moore, Journ. Linn. Soc. Lond., Zoology, vol. xxi, p. 44 (1886).

narrower and less distinct, the submarginal and marginal lunules obsolescent; the anal angle less speckled with metallic-green scales, the anal black spot only present."

"In *S. alea* the underside is uniformly purplish-brown, the markings all of a regular colour and distinctly lined with pale purplish-white." (*Moore*, l. c.)

I possess a single male example of this species from Travancore, kindly sent me by Mr. Harold S. Ferguson. It is remarkable in having all the spots on the underside smaller than in any species of the genus known to me. It probably takes the place in extreme South India of *A. atrax*, Hewitson.

800. **Arhopala alea,** Hewitson.

Amblypodia alea, Hewitson, Cat. *Lycænidæ* B. M., p. 12, n. 57, pl. vii, figs. 79, 81, *male* (1862); *Satadra alea*, Moore, Journ. A. S. B., vol. liii, pt. 2, p. 38 (1884).

HABITAT: India (*Hewitson*).

EXPANSE: ♂, 1·5 inches.

DESCRIPTION: "MALE. UPPERSIDE, *both wings* violet-blue. *Forewing* with the outer [black] margin rather broad. *Hindwing* with the margins as broad as in the females of other species. UNDERSIDE, *both wings* brown, tinted with lilac. *Forewing* with the transverse band long and narrow, slightly curved. *Hindwing* with the band broken, ill-defined, the anal angle irrorated with white." (*Hewitson*, l. c.)

Mr. Hewitson's recorded locality for this species is very vague. I have not seen a specimen.

801. **Arhopala atrax,** Hewitson.

Amblypodia atrax, Hewitson, Cat. *Lycænidæ* B. M., p. 13, n. 58, pl. vii, figs. 80, 82, *female* (1862); id., Moore, Proc. Zool. Soc. Lond., 1865, p. 774; *Satadra atrax*, id., Journ. A. S. B., vol. liii, pt. 2, p. 39 (1884).

HABITAT: India (*Hewitson*); foot of the Himalayas from Dehra Dun to Bhutan; Malda, and Chota Nagpur Districts; Central Provinces; Calcutta; Orissa; Nilgiris.

EXPANSE: ♂, ♀, 1·4 to 1·7 inches.

DESCRIPTION: "MALE. UPPERSIDE, *both wings* brilliant violet-blue, the margins with a broad border, as in *A. alea*, Hewitson. UNDERSIDE, *both wings* rufous-brown, tinted with lilac. *Forewing with the transverse band broken at the middle*, the lower half at a greater distance from the margin. *Hindwing has the medial band with its two branches unbroken*, the anal angle irrorated with silvery-blue. FEMALE. UPPERSIDE, *both wings* rufous-brown. *Forewing* only with a large spot of lilac-blue from the base to the middle. UNDERSIDE, *forewing differs from the male in having the band unbroken. Hindwing with the upper branch of the band broken off.*"

"I have had much difficulty in making out *A. atrax* and *A. alea* to my satisfaction. I believe that I am correct with regard to the sexes of *A. atrax*; they may, however, belong to different species." (*Hewitson*, l. c.)

I give Mr. Hewitson's description of this species as he wrote it. I have no doubt at all that he mixed up two distinct species under *A. atrax*, but the species is easily recognisable from his figure of the female. I describe the species in full thus:—

MALE. UPPERSIDE, *forewing* with the costa narrowly, the outer margin somewhat broadly (about one-tenth of an inch broad) blackish, the rest of the wing rather obscure dull purple. *Hindwing* with only a small patch of purple from the base to the middle of the disc, a whitish lunule on the margin on either side of the tail. UNDERSIDE, *both wings* greyish-brown, faintly glossed with purple, the spots and fasciæ small but distinct, dark brown margined with greyish. *Forewing* with the inner margin broadly paler; a very small spot near the base of the cell, a larger elongated one at its middle, a still larger attenuated spot closing the cell; two large spots below the cell divided by the first median nervule; an even slightly outwardly-curved discal macular fascia, its lowest spot below the first median nervule separated and placed obliquely; submarginal and marginal obscure fasciæ. *Hindwing* with four very small subbasal spots arranged nearly equi-distantly across the wing, another spot below the costal nervure before the middle of the costa, one in the middle of

the cell, an elongated spot closing the cell, with two spots below divided by the second median nervule, an irregular discal catenulated band; submarginal and marginal fasciæ more prominent than in the forewing, the anal region from the black anal lobe to the second median nervule irrorated with metallic blue scales. FEMALE. UPPERSIDE purplish-brown. *Forewing* with the purple area much more restricted than in the male, the disco-cellular nervules marked with a black tooth from the costal area. *Hindwing* with no purple area. UNDERSIDE, *both wings* marked precisely as in the male.

A. atrax shares with *A. amantes*, Hewitson, the peculiarity of being a plains insect, with its head-quarters in Orissa and Chota Nagpur, where at times it may be said to swarm. Mr. P. W. Mackinnon has sent me specimens from as far west as Dehra Dun, which were taken in April; Mr. W. H. Irvine has found it at Bholahât in the Malda district; it occurs rarely in Sikkim; Mr. A. V. Knyvett has taken it at Jalpaiguri; it is very decidedly rare in Calcutta and Barrackpore, but swarms as stated above, in Chota Nagpur, Central Provinces, and Orissa. Mr. G. F. Hampson reports having taken a single specimen on the lower slopes of the Nilgiris. It may be best discriminated from *A. alea*, Hewitson, and *A. canaraica*, Moore, by the greyer tone of coloration on the underside, these species (especially the latter) having the purple washing more prominent and of a vinous shade.

802. **Arhopala aida,** de N.

A. aida, de Nicéville, Journ. Bomb. Nat. Hist. Soc. vol. iv, p.   , n.   , pl. A, fig. 1, *male* (1889).

HABITAT: Burma.

EXPANSE: ♂, 1·60; ♀, 1·45 inches.

DESCRIPTION: "MALE. UPPERSIDE, *both wings* shining bluish-purple of exactly the same tint as in *A. selta*, Hewitson, and *A. rafflesii*, mihi. *Forewing* with the outer margin broadly black (a little broader than in *A. selta*). *Hindwing* with the outer black margin even, as broad as in the forewing; the costa more broadly black. UNDERSIDE, *both wings* purplish-brown, strongly glossed with purple, all the markings prominent, a little darker than the ground-colour, outwardly narrowly and clearly defined with whitish. *Forewing* with the inner margin broadly paler; an oval spot near the base of the cell; an oblong one at its middle, with a costal spot above it; a quadrate spot closing the cell, also with a costal spot above it; a discal macular band dislocated below the third median nervule, the fourth spot nearer the margin, the two spots which follow further removed from the margin, a large quadrate spot in continuation in the submedian interspace; a pair of submarginal fasciæ, but more prominent than usual. *Hindwing* with the usual basal annular spots, a spot closing the cell, a discal band formed of spots arranged more or less in pairs, the usual marginal lunular fasciæ, the small anal lobe black, a small black spot in the first median interspace on the margin, the space between this spot and the anal angle sprinkled with metallic-green scales. FEMALE. UPPERSIDE, *both wings* of a lighter more bluish shade than in the male, the outer margins much broader; otherwise as in the male."

"Described from a single male (the type) captured by Major C. T. Bingham on the Pegu Yoma, Burma, in December, 1887, and two males and a female captured by Mr. W. Doherty at Mergui and in the Tenasserim Valley in the cold season of 1888-89. One of these males differs slightly from the type in having all the markings of the underside rather larger and darker, consequently they are more prominent." (*de Nicéville*, l. c.)

Below will be found a description of *A. adatha*, Hewitson, from Malacca and Singapore.* What I take to be the typical form of this species (figs. 29 and 30) is rather larger than *A. aida*

* *Arhopala adatha*, Hewitson. *Amblypodia adatha*, Hewitson, Cat. *Lycænidæ* B. M., pl. iv, figs. 29. 30, *male* (1862); id., Butler, Trans. Linn. Soc Lond., Zoology, second series, vol. i, p. 548, n. 4 (1877); *Narathura adatha*, Distant, Rhop. Malay., p. 265, n. 6, pl. xxiii, figs. 1, *male*; 2, *female* (1885). HABITAT: Malacca, Singapore (*Distant*); Borneo (*Butler*). EXPANSE: *Male* and *female*, 1·6 to 1·7 inches (*Distant*). DESCRIPTION: "MALE. UPPERSIDE, *both wings* dark violaceous-blue (a specimen received from Singapore has the colour above darker blue and less violaceous than in the figures here given, which are taken from Malaccan specimens in the British Museum). *Hindwing*, apex of tail greyish-white. UNDERSIDE, *both wings* brownish, with the following spots and fasciæ margined with greyish :– *Forewing* with two spots in, and one at the end of the cell, two spot

and *A. rafflesii*, as it measures two inches exactly in expanse. I also give below a description of *A. achelous*, Hewitson, from Singapore and Borneo,† which appears to differ from the rest of this group in the male being ultramarine-blue (as figured) on the upperside of both wings.

803. **Arhopala rafflesii**, n. sp.

Narathura amphimuta, Distant (*nec* Felder), Rhop. Malay., p. 267, n. 11, pl. xxi, figs. 10, *male*; 9, *female* (1885).

HABITAT: Burma, Penang, Province Wellesley, Singapore.

EXPANSE: ♂, ♀, 1·3 to 1·8 inches.

DESCRIPTION: "MALE. UPPERSIDE, *both wings* violaceous-blue, margins narrowly dark fuscous. UNDERSIDE, *both wings* brownish, with the following spots and fasciæ [of a darker shade of brown than the ground] margined with greyish:—*Forewing* with two spots in, and one at the end of the cell, two beneath the cell divided by the first median nervule, a slightly curved fascia between the end of the cell and the outer margin, which is strongly dislocated between the lower discoidal and third median nervules (where it has the appearance of a projecting spot, not sufficiently shown in the figure of the female here given, though it is distinctly indicated in that of the male), a subcostal spot between the first and second subcostal nervules, and a narrow submarginal fascia. *Hindwing* with six basal spots, two irregular medial curved macular fasciæ, dislocated and united into one from the lower subcostal nervule to the costal nervure, a submarginal fascia and three marginal metallic greenish spots more or less marked with black near the anal angle. *Tail* with its apex greyish-white. *Body* above and beneath with *legs* more or less concolorous with

beneath the cell divided by the first median nervule, a curved fascia (dislocated at the third median nervule) between the cell and the outer margin, and a narrower submarginal fascia. *Hindwing* with seven basal spots, a transverse medial fascia commencing at the costal nervure and terminating near the base of the third median nervule, followed by a transverse fascia commencing at the lower subcostal nervule, a submarginal fascia and three marginal transverse metallic greenish spots, more or less spotted with black, near the anal angle. *Body* above and beneath more or less concolorous with the wings. FEMALE. UPPERSIDE, *both wings* with broad darker margins. Otherwise as in the male." (*Distant*, l. c.)

"This is quite distinct from *A. micale*, Boisduval." (*Butler*, l. c.)

Mr. Hewitson placed the name *Amblypodia adatha* on the plate in which he figured three male specimens of this species. I think this name should apply to figures 29 and 30 only, fig. 31 representing a much larger insect, with the discal band on the underside of the forewing unbroken, and has also an additional subcostal spot, besides there are other differences of detail in the markings, and fig. 29 one with the band narrower and distinctly broken at the third median nervule, and shifted inwards below that vein. His three figures represent in my opinion two distinct species; unfortunately he does not indicate in the letter press from what localities the specimens he figured were obtained, but it is probable that the large specimen came from Amboyna and the small one from Singapore. In the text (p. 7, n. 32) he sunk his name *adatha* under *micale*, Boisduval, given by Westwood, in the Gen. Diurn. Lep., vol. ii, p. 478, n. 11, as from New Guinea; and also placed the *cleander* of Felder from Amboyna as a synonym of *micale*. Subsequently, he raised *adatha* to specific rank with *cleander* still as a synonym, keeping *micale* as a distinct species (Ill. Diurn. Lep. p. 8, n. 28). I think it extremely probable that the species from the Malay Peninsula (? true *adtaha*), the species from New Guinea (*micale*), and the species from Amboyna (*cleander*) are all distinct species, and moreover, that the species which Distant has figured from Malacca, and Hewitson's figures 29 and 31 represent distinct species, as in Distant's figures the male is shown with no black border whatever on the upperside, while Hewitson's figure 30 shows a rather broad black border, and a quite different shade of coloration; in Distant's figures the spots and fasciæ of the underside are no darker than the ground, in Hewitson's figure 29 they are much darker, almost black towards the base of the wing. Distant says that the specimens he figures and describes agree with Hewitson's type specimens, but that they do not altogether correspond with his figures. As I have stated elsewhere (p. 228), in the case where specimens agree better with Hewitson's figures than with the specimens standing under the name of the species in his collection, the figures should be taken to represent the type and not the specimens, the latter most probably having been changed. I must leave this species in this unsatisfactory condition, having no specimens of it; it is to be regretted Mr. Distant did not clear up the matter when he had the opportunity, instead of involving it in greater obscurity.

† *Arhopala achelous*, Hewitson. *Amblypodia achelous*, Hewitson, Cat. *Lycænidæ* B. M., p. 7, n. 30, pl. v, figs. 47, 48, *male* (1852); id., Druce, Proc. Zool. Soc. Lond., 1873, p. 354, n. 13; *Narathura achelous*, Distant, Rhop. Malay., p. 271, n. 18, woodcut n. 82, *male* (1885). HABITAT: Singapore (*Hewitson*), Borneo (*Druce*). EXPANSE: *Male*, 1·8 inches. DESCRIPTION: "MALE. UPPERSIDE, *both wings* dark blue, the margins with a narrow border of brown. UNDERSIDE, *both wings* rufous-brown, the costal margins broadly lilac. *Forewing* with the band broken, formed of five spots, the middle spot projecting towards the outer margin. *Hindwing* without a band, the apex [anal angle] with four black spots irrorated with golden green. FEMALE. UPPERSIDE, *both wings* like those of the male, except that the blue colour is lighter, with the margins broadly brown. UNDERSIDE, *both wings* with the costal margins paler than in the male." (*Hewitson*, l. c.)

Neither Mr. Distant nor I have seen this species. In the male, as shown in Hewitson's figure, the coloration of the upperside is ultramarine blue, the outer black margins reduced to a thread; on the underside the forewing is very heavily marked, all the spots are large, and there are three costal spots; the costal half of the hindwing is lilac, all the spots on this lilac portion are prominent and black, the rest are pale brown; the discal band appears to be present, but somewhat irregular and obsolete. The species if obtained should be easily recognisable.

the wings. FEMALE. UPPERSIDE, *both wings* paler bluish, the dark marginal shadings very broad on the forewing at the apex and the outer margin, and at the apex of the hindwing. UNDERSIDE, *both wings* as in the male."

"This species varies greatly in size, the smallest specimen examined being a female and expanding only 1·3 inches. As Mr. Hewitson pointed out, an excellent differential specific character is found in the spot-like projection to the discal fascia on the underside of the forewing; but when the describer states that in the female the last spot of this fascia also projects outwardly, he has described what is found on none of the specimens now before me." (*Distant*, l. c.)

Mr. Distant identifies this species with the *Amblypodia amphimuta* of Felder, and the *A. hypomuta* of Hewitson. As I have stated elsewhere (p. 276), not only do I think that those two species are distinct from one another, but also that the species now under discussion is distinct from both, not only by its having a tail, which the others lack, but also in its coloration and markings. Two male specimens captured in Singapore which I have received from Mr. W. Davison, agree almost exactly with Mr. Distant's description and figure of the same sex, the only point of difference being that one subcostal spot only is described to the forewing on the underside, while my specimens have two. The species is, I think, a good and easily recognisable one. It is nearest to *A. aida*, mihi, from which it may be known in the male having the outer black margin of the forewing on the upperside narrower; the colour of the ground on the underside is also very different, being dull brown, without any of the purple gloss, which is so very characteristic of *A. aida*. I am enabled to include it amongst the Indian species owing to Mr. W. Doherty having obtained a single male at Myitta, in the Tenasserim Valley, Burma, in the cold season of 1888-89.

804. **Arhopala bazalus**, Hewitson.

Amblypodia bazalus, Hewitson, Cat. *Lycænidæ* B. M., p. 8, n. 38, pl. iv, figs. 37, 38, *female* (1862); *Satadra bazalus*, Moore, Journ. A. S. B., vol. liii, pt. 2, p. 39 (1884).

HABITAT: Sylhet, Java (*Hewitson*), Nepal (*Moore*), Shillong, Cachar.

EXPANSE: ♂, ♀, 1·6 to 1·8 inches.

DESCRIPTION: "MALE. UPPERSIDE, *both wings* purple, the margins black, narrow. *Hindwing* with the margins broadly brown. UNDERSIDE, *both wings* rufous-brown, varied with lilac and grey, the apices grey, the spots brown, with very narrow borders of white. *Forewing* with the transverse band of equal breadth, broken below the middle, formed of six spots, placed four and two. *Hindwing*, the band with two branches, the anal angle very slightly irrorated with green. FEMALE. UPPERSIDE, *both wings* brown. *Forewing* blue from the base to the middle. *Hindwing* slightly blue at the base. UNDERSIDE, *both wings* as in the male." (*Hewitson*, l. c.)

A. bazalus is a very distinct and easily-recognised species. On the underside of the forewing the inner margin is broadly pale, the apex irrorated with grey and glossed with purple, all the markings very large and surrounded narrowly with whitish, a good-sized spot near the base of the cell, a large spot at its middle, a very large spot at its end; a very broad discal band, consisting first of four spots placed obliquely outwards, then two spots shifted inwardly and breaking the line, often with a seventh small separated spot below the first median nervule, the usual submarginal and marginal obscure fasciæ. Hindwing heavily irrorated with whitish, the spots more numerous than usual and prominent; in addition to the usual four basal spots, there are two large spots near the base of the wing above the costal nervure, a large spot below the outer of these two spots beneath the costal nervure, a large spot in the middle of the cell, and one closing it, with two spots below the last divided by the first median nervule; the usual discal band very irregular, its anterior portion consisting of two very large and prominent spots; a prominent submarginal lunular line; the anal lobe black, with a sprinkling of metallic dull green scales beyond.

This species occurs rarely in the neighbourhood of Shillong, and Mr. Wood-Mason obtained one female at Silcuri on 31st May, and another at Dhurmkhal on 14th July, 1888,

in Cachar. Assam is the only locality from which I have seen specimens of this species, though it has been recorded from Nepal and Java.

805. **Arhopala singla**, de N.

Satadra singla, de Nicéville, Journ. A. S. B., vol. liv, pt. 2, p. 119, pl. ii, figs. 8, *male* ; 7, *female* (1885).

HABITAT : Sikkim.

EXPANSE : ♂, 1·8 ; ♀, 1·8 to 2·0 inches.

DESCRIPTION : "MALE. UPPERSIDE, *both wings* very dark shining purple, with a somewhat broad black margin. *Forewing* with a distinct black disco-cellular mark, and another black mark beyond, being a tooth-like projection from the black costa into the purple discal area, neither of these black marks are shewn in the figure. UNDERSIDE, *forewing* brown, paler towards the inner margin, widely washed at the apex with pale violet, and bearing the following dark brown spots with pale margins :—a circular one towards the base of the cell, a large oval one just beyond its middle, and a quadrate one closing it, above the last is a small spot on the costa, one filling the base of the interspace between the first and second median nervules, and a large one below and within the latter reaching the submedian nervure ; a discal chain of seven spots, broken and inclined inwards at the fifth spot, a submarginal lunular band not reaching the apex, the margin dark brown. *Hindwing* pale brown, all but the bands and spots powdered with pale violet-whitish, giving it an unusual and peculiar appearance. The spots and bands arranged as in other species of this group, somewhat indistinct. The anal lobe rufous-brown (not black as in many species) ; in one specimen a few metallic-green scales above and beyond it. *Tail* of moderate length, pale brown, tipped with white. FEMALE. UPPERSIDE, *forewing* with a large patch of bluish-violet in the middle. *Hindwing* with some traces of this colour in the cell and just below it. UNDERSIDE, *both wings* with the ground-colour and markings paler throughout than in the male."

"Near to *Satadra* [= *Arhopala*] *bupola*, Hewitson, many specimens of both sexes of which species, also from Sikkim, are now before me. The male of *S. singla* may be distinguished at once from that species by the much narrower and more produced forewing, by the colour of the upperside being of a much darker shade of purple, and both sexes by the violet-whitish powdering of the hindwing on the underside. Allied also to *S. silhetensis*, Hewitson, a female specimen of which from the typical locality is in the Indian Museum, Calcutta. On the upperside of the latter the violet-blue colour is far more extensive and lighter in shade, the underside is also uniform bright brown throughout, not powdered with violet-white as in *S. singla*." (*de Nicéville*, l. c.)

The above remarks comparing *S. singla* to *S. bupola* are incorrect, the latter species being, I am now confident, the female of *A. eumolphus*, Cramer, and what I thought to be the male of *A. bupola* some other species. I am unable to say how the female of *A. singla* is to be distinguished from that of *A. teesta*. Mr. Otto Möller possesses two males of *A. singla* taken in April, and eighteen females, which may belong to either *A. singla* or *A. teesta*. I also possess two males and nine females. I have no doubt whatever that *A. singla* and *A. teesta* represent two perfectly distinct species, as the males can be distinguished at a glance by the coloration of the upperside ; but, as the undersides of the two species are alike, I do not know how their respective females from Sikkim are to be recognised. As *A. singla* is only known from Sikkim, females from other localities may safely be placed under *A. teesta*.

806. **Arhopala teesta**, de N. (PLATE XXVII, FIG. 197 ♂).

Satadra teesta, de Nicéville, Journ. A. S. B., vol. lv, pt. 2, p. 253, n. 6, pl. xi, fig. 3, *male* (1886).

HABITAT : Sikkim, Sylhet, Upper Tenasserim.

EXPANSE : ♂, 1·8 inches.

DESCRIPTION : "MALE. UPPERSIDE, *both wings* of a very deep purple, of a deeper shade than in any species of the group known to me. *Forewing* with a very narrow black marginal line. *Hindwing* with the black marginal line much broader than on the forewing ; *tail* black, tipped with white. UNDERSIDE, *both wings* marked almost exactly as in *S.* [= *A.*] *singla*, de Nicéville."

"Nearest to *S. singla*, from which it differs in the forewing being shorter and truncated instead of produced at the apex, the marginal black line on the upperside only a quarter as broad, and the coloration of both wings of a deeper shade of purple. Obtained in the Teesta Valley, Sikkim, by Mr. Otto Möller, in whose collection the type specimen is deposited." (*de Nicéville*, l. c.)

Mr. Otto Möller possesses eleven males of this species, some of which were taken in November. The much deeper purple coloration and the narrower outer black border of the upperside of both wings will at once distinguish it from *A. singla*, mihi. I am unable to say how the female of *A. teesta* can be distinguished from that of *A. singla*. Its range is wider than I was aware of when I described it from Sikkim specimens, the Rev. Walter A. Hamilton having sent me both sexes taken near Shillong, probably in the low hot Sylhet Valley, and I possess a male taken by Major C. T. Bingham at Shwayghan in Upper Tenasserim.

The figure shows both sides of a male specimen from Sikkim in the collection of Mr. Otto Möller.

I give below as a foot-note* a description of *A. agrata*, mihi, which occurs at Singapore. On the upperside it resembles *A. teesta* in having thc ground of the same very deep shade of purple.

807. **Arhopala rama**, Kollar.

Thecla rama, Kollar, Hügel's Kaschmir, vol. iv, pt. 2, p. 412, n. 1, pl. iv, figs. 1, 2, *male* (18,8); *Amblypodia rama*, Hewitson, Cat. *Lycænidæ* B. M., p. 13, n. 59, pl. vii, figs. 69, 70, *male*; 71, *female* (1862); id., Leech, Trans. Ent. Soc. Lond., 1889, p. 111, n. 51; *Panchala rama*, Moore, Proc. Zool. Soc. Lond., 1882, p. 252; id., Doherty, Journ. A. S. B., vol. lv, pt. 2, p. 126, n. 122 (1886); id., Butler, Ann. and Mag. of Nat. Hist., sixth series, vol. i, p. 145, n. 38 (1888); *Amblypodia querceti*, Moore, Horsfield and Moore, Cat. Lep. Mus. E. I. C., vol. 1, p. 43, n. 64 (1857).

HABITAT: Himalayas, Burma, China.

EXPANSE: ♂, ♀, 1·50 to 1·75 inches.

DESCRIPTION: "MALE. UPPERSIDE, *both wings* purple. *Forewing* angulated exteriorly, with broadish brown exterior margin commencing from middle of anterior margin. *Hindwing* rounded, one tail, with broad brown margins. UNDERSIDE greyish-brown, slightly rufescent on the forewing, an undulating broad band of rufescent-brown crosses both wings, another inwardly on the hindwing half across the wing, then two or three spots; near exterior margin of both wings is an indistinct angulated line. FEMALE. UPPERSIDE, *forewing* with the discoidal cell and posterior base purple, the disc being somewhat lighter and pinky, the rest of the wing brown. *Hindwing* with the middle purple, the rest brown." UNDERSIDE, *both wings* as in the male. (*Moore*, l. c. in Cat. Lep. Mus. E. I. C.)

Mr. Doherty remarks (l. c.) that though this species "belongs to a tropical group, I found it flying in great numbers on the mountain near Ramgarh, 7,500 feet, in December, when the ground was powdered with snow. The males and females of *A. rama* are very much alike. *A. dodonæa* seems to be a distinct species."

Mr. Hewitson (l. c.) says that "This species may be known by the silky gloss of the underside. It is the same in both sexes."

"The males are larger than the females, and have a narrower black border to the forewing on the uppersidc. *P. rama* and *P. dodonæa* are both common species" at Murree. (*Butler*, l. c.)

A. rama is one of the commonest and most widely-spread spccies of the genus. In the

* *Arhopala agrata*, n. sp. (FRONTISPIECE, Fig. 137, *Male*). HABITAT: Singapore. EXPANSE: *Male*, 1·8 inches. DESCRIPTION: MALE. UPPERSIDE, *both wings* extremely deep purple, almost black, of the exact shade of *A. teesta*, mihi; *cilia* black. *Hindwing* with the abdominal margin pale. UNDERSIDE, *both wings* dull brown, all the markings very indistinct, but very slightly darker than the ground, outlined obscurely with grey. *Forewing* with the usual three spots in the cell, two below it divided by the first median nervule, the discal band composed of five spots, the two lowest shifted inwards below the third median nervule. *Hindwing* with the usual bands and spots; the black anal lobe very small, with some metallic blue irrorations beyond; *tail* probably of the usual length, but mutilated in my specimens, a portion of the base alone remaining.

Described from two specimens communicated to me by Mr. W. Davison, Curator of the Raffles Museum, Singapore. *A. agrata* is not closely allied to any species as far as I am aware.

The figure shews both sides of the type male in the collection of the Raffles Museum, Singapore.

Western Himalayas, it occurs in oak woods in the outer ranges up to about 9,000 feet. It is much rarer in Sikkim, which may be its eastermost range in the Himalayas. Mr. Otto Möller has specimens taken in Sikkim in April and July. I possess the following specimens taken by Major C. T. Bingham in Upper Tenasserim :—a male from the Meplay valley taken in January, a female from the Donat range taken in the same month, and another female taken in the Thoungyeen forests in March. All are a little larger than typical specimens of *A. rama*, the purple coloration of the upperside in both sexes is more extensive, the ground-colour of the underside is paler, the discal band in the forewing broader and more regular. All these differences are very slight, and do not in my opinion warrant the description of this local race as a distinct species. *A. japonica*, Murray, from Japan, is a very close ally of *A. rama*, but entirely lacks tails. Mr. Leech records *A. rama* from Kiukiang in China, and says that it "seems to be fairly plentiful in July."

808. **Arhopala asoka**, de N.

Nilasera ? asoka, de Nicéville, Journ. A. S. B., vol. lii, pt. 2, p. 78, n. 19, pl. ix, figs. 6, *male*; 6*a*, *female* (1883); *Satadra chola*, Moore, Journ. A. S. B., vol. liii, pt. 2, p. 39 (1884).

HABITAT: Sikkim.

EXPANSE: ♂, 1·75 to 1·90; ♀, 1·80 inches.

DESCRIPTION: "MALE. UPPERSIDE, *both wings* dark glossy purple, the costa and outer margin of the *forewing* narrowly black, the costal, outer, and abdominal margins of the *hindwing* more widely black. *Tail* long, narrow, black with white tip. UNDERSIDE, *forewing* with a pale line across the middle of the cell (sometimes absent), a spot near the end of the cell variable in size and shape, a quadrate spot from the second-fifth of the first median nervule to the inner margin, a chain of square spots divided only by the nervules beyond the cell from the costa to the first median nervule, the third lower spot being posteriorly lengthened towards the outer margin, the two following it rectangular, thus giving the chain a broken appearance at the third median nervule—all these markings placed on a rich dark brown ground; the apex and decreasingly to the first median nervule paler and glossed with violet, inwardly sharply defined, the outer margin dark brown at the apex, paler towards the inner angle. *Hindwing* with the base of the wing rich dark brown, with an even pale violet streak from the costa to the base above the cell; a discal irregular dark brown band placed on a pale violet ground, and other paler irregular markings beyond; a submarginal lunulated line and three black spots beyond it at the anal angle almost covered with brilliant green iridescent scales. FEMALE. UPPERSIDE, *forewing* black; with the cell (all except its extreme end), the basal half of the lower discoidal, median, submedian, and internal interspaces iridescent light ultramarine blue. *Hindwing* with the middle and base of the wing blue as in the forewing. UNDERSIDE, *both wings* with the markings as in the male."

"The markings of the underside of the forewing of this species are nearest to the *Amblypodia diardi* of Hewitson, they differ largely, however, in the hindwing." (*de Nicéville*, l. c.)

Certainly the commonest "hair-streak" in Sikkim. Mr. Otto Möller possesses specimens dated end of June and July. It appears to be a strictly local species. I have no record of its occurrence elsewhere.

I append as a foot-note* the description of this species which was published by Mr. Moore, almost immediately after my description had appeared (March 6th as against June 30th, 1884).

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* *Satadra chola*, Moore, Journ A. S. B., vol. liii, pt. 2, p. 39 (1884). HABITAT: Sikkim. EXPANSE: *Male* and *female*, 1·6 inches. DESCRIPTION: "Closely allied to *S. areste*, Hewitson. MALE. UPPERSIDE, *both wings* of a comparatively darker purplish-blue, the marginal black borders being one half less the width. UNDERSIDE, *forewing* more dusky olive-brown in colour, with much narrower whitish cell-streak, quadrate spot beneath it, and transverse discal band, the outer band being more defined. *Hindwing* with similarly disposed markings, except that the subbasal band is very broad and entire (not macular as in *S. areste*), and the markings are all of a dark somewhat aenescent-brown, with pale pinkish-white borders, and the interspaces pale pinkish-violet colour (not grey as in *S. areste*); at the anal angle is a marginal black spot, and another between the second and first median nervules, both spots and the intervening marginal space speckled with metallic-green scales. FEMALE. UPPERSIDE, *both wings* also have the blue area extending comparatively more over the disc than in *S. areste*." UNDERSIDE, *both wings* as in the male. (*Moore*, l. c.)

The type specimens of both sexes of *S. chola* are in my collection.

Mr. Moore compares it with *A. areste*, Hewitson, but as that species has no tail, in my opinion the two species are very distantly related. It is possible that Mr. Moore has failed to correctly identify *A. areste*, as he has attached that name to specimens of both sexes of *A. adriana*, mihi, in my collection.

809. Arhopala adriana, de N.

Nilasera ? adriana, de Nicéville, Journ. A. S. B., vol. lii, pt. 2, p. 79, n. 20, pl. ix, figs. 5, *male* ; 5*a*, *female* (1883).

HABITAT : Sikkim.

EXPANSE : ♂, 1·6 to 1·9 ; ♀, 1·65 to 1·80 inches.

DESCRIPTION : " MALE. UPPERSIDE, *both wings* as in *N.* [=*A.*] *asoka*, de Nicéville, but the black bordering at least twice as wide. UNDERSIDE. *Forewing* marked as in *N. asoka*. *Hindwing* dark brown glossed almost throughout with pale violet-grey, but exceedingly variable, in some specimens the ground-colour is very pale, the markings therefore being very prominent, in others so dark that they are hardly traceable ; three subbasal small round spots, a chain of spots from the costa to the middle of the cell, another chain also from the costa crossing the cell at its end, a third chain from the subcostal nervure to the abdominal margin, a submarginal lunulated line, but no black, green-irrorated, anal spots, which at once distinguishes this species from *N. asoka*. FEMALE. UPPERSIDE, *both wings* as in *N. asoka*, but the blue colour of a more purple shade. UNDERSIDE as in the male."

"This is apparently one of the commonest 'hair-streaks' in Sikkim." (*de Nicéville*, l. c.) This species also has a limited range, Sikkim being the only locality I know for it.

810. Arhopala apidanus, Cramer.

Papilio apidanus, Cramer, Pap. Ex., vol. ii, pl. cxxxvii, figs. F, G, *male* (1777) ; id., Fabricius, Sp. Ins., vol. ii, p. 119, n. 530 (1781) ; idem, id., Mant. Ins., vol. ii, p. 69, n. 658 (1787) ; *Hesperia apidanus*, id., Ent. Syst., vol. iii, pt. 1, p. 280, n. 78 (1793) ; *Polyommatus apidanus*, Godart, Enc. Méth., vol. ix, p. 652, n. 118 (1823) ; *Amblypodia apidanus*, Horsfield, Cat. Lep. E. I. C., p. 100, n. 32 (1829) ; id., Horsfield and Moore, Cat. Lep. Mus. E. I. C., vol. i, p. 39, n. 53, pl. i, figs. 5, *larva* ; 5*a*, *pupa* (1857) ; id., Butler, Cat. Fab. Lep. B. M., p. 180, n. 2 (1869) ; idem, id., Trans. Linn. Soc. Lond., Zoology, second series, vol. i, p. 549, n. 12 (1877) ; *Satadra apidanus*, Moore, Journ. A. S. B., vol. liii, pt. 2, p. 41 (1884) ; *Panchala apidanus*, Distant, Rhop. Malay., p. 273, n. 3, woodcut n. 85, *male* (1885) ; *Thecla appidanus*, Horsfield, Cat. Lep. E. I. C., pl. iv, figs. 3, *larva* ; 3*a*, *pupa* (1829) ; *Amblypodia aphidanus*, Druce, Proc. Zool. Soc. Lond., 1873, p. 353, n. 7 ; *Papilio dorimond*, Stoll, Suppl. Cramer, pl. xxxvii, figs. 4, 4D, *female* (1790).

HABITAT : Mergui, Moulmein, Malacca, Singapore, Sumatra, Java, Borneo.

EXPANSE : ♂, ♀, 1·42 to 1·83 inches.

DESCRIPTION : " MALE. UPPERSIDE, *both wings* covered on the whole surface, excepting a very narrow posterior black marginal thread, with a saturated purple tint, reflecting in a certain light a cyaneous gloss, or transmitting in another aspect the blackish ground-colour with a faint livid lustre. UNDERSIDE, *both wings*, the ground-colour is deep brown with a reddish cast, and marked with broad cinereous slightly yellowish bands, and with occasional pearly spots ; the tip of the forewing, and the whole surface of the hindwing, being covered with a purple reflexion ; the wings bear individually, at the base, near the costa, an oblique attenuated streak of a deep crimson shining tint. *Forewing* has further three grayish bands, of which the first is abruptly terminated before the disc, and often appears in the form of a short stigma, the two others are terminated in the anal region at a small distance from the inner margin ; the exterior band is often undefined and spreads diffusely to the margin ; in some specimens a few minute grayish dots stand near the base. *Hindwing*, the basal portion is dark brown ; a broad cinereous band, highly tinctured with purple, occupies the medial portion, bearing a compound brown band faintly bordered with gray, consisting in the costal area of a short simple brown patch to which two parallel bands are joined, the anterior being interrupted, the posterior continued and united with a deep ferruginous blackish-brown band which passes in an arch across the disc ; exterior to this are a few obsolete dots near the posterior margin, being defined internally by a narrow waving blackish striga ; the dots towards the outer apical angle are very faint, but in the anal region are *two* pronounced black *subocellate spots*, the exterior being placed between the tails, and the other, which is largest, at the extreme anal angle ;

they are generally speckled with white within and at the sides, and in some cases adorned with a few silvery spots. *Body* deep blackish-brown or purple above, and ferruginous-brown and hairy underneath. *Antennæ* are nearly throughout ferruginous-brown. The intermediate *tail* is narrowly tipt with gray. *Tarsi* of the male covered above with small, and of the female with large scales, which appear pendulous under the lens. FEMALE. UPPERSIDE, *both wings* blackish-brown, with a brilliant cyaneous patch, adorned with a rich silvery gloss of a more intense tint at the base, and defined in both wings according to the outline of the wing, being separated from the margin by a broad regular border of the blackish-brown ground-colour. UNDERSIDE, *both wings* as in the male." (*Horsfield*, l. c.) Dr. Horsfield places this species in his three-tailed group, but the tail at the extreme anal angle and the one at the termination of the second median nervule are extremely small.

LARVA limaciform, black, marked with longitudinal reddish-brown and pale yellow stripes; the segments well-defined, the sides furnished with numerous short bristly hairs; the head small; the second segment unusually large, pale yellow, marked with a median fine black line, then on each side a U-shaped mark, and lastly a small round dot placed posteriorly; each segment bearing laterally a prominent round dot placed on a pale yellow patch; the third to the penultimate segment inclusive of nearly equal size, the last segment anteriorly cut off or flattened. PUPA rather elongated, smooth, the head rounded, the thorax but slightly humped, the tail pointed; colour pale reddish, streaked and marked with dark brown and black. Described from the figures in Horsfield and Moore's Catalogue. Dr. Horsfield says that in Java "the larva feeds on the leaves of several species of *Eugenia* and *Calyptranthes*," and that the insect occurs commonly in the island.

I have seen but a single specimen of this species, a male from Borneo in the collection of the Indian Museum, Calcutta. The species may be known from every other by the very broad regular dark brown band on the underside of the hindwing, which extends across the disc from the second subcostal nervule to the abdominal margin; the band anterior to this is pale purple, and bears a series of dark brown spots, the first on the costa is large and quadrate, the next in the middle of the wing is smaller, the third in the submedian interspace oval and the smallest of all. A specimen in the British Museum from Moulmein recorded by Mr. Butler is the only knowledge I have of the occurrence of *A. apidanus* within strictly Indian limits. Mr. Distant considers it to be a very rare species in the Malay Peninsula. Captain Pinwill obtained it at Malacca, and Mr. Godfery at Singapore.

Since the above was written I have seen a female of *A. apidanus* taken by Mr. W. Doherty at Mergui in the cold weather. He writes regarding it:—"Mr. Distant makes no mention of the singular scarlet costal area at the base of both wings below in this species, though they had long ago been observed by Cramer, Godart, and Horsfield. They are occasionally present, though much less marked, on the forewing of some of the Himalayan species of this genus, as Mr. de Nicéville has shewn me."

"This species is the type of my genus *Flos*, the life-history of which I hope to publish before long. I have taken it in Eastern Java, and slightly different forms occur in Celebes and in the mountains of Sambawa."

811. **Arhopala fulgida**, Hewitson.

Amblypodia fulgida, Hewitson, Ill. Diurn. Lep., *Lycænidæ*, p. 11, n. 49, pl. v, fig. 31, *female* (1853); *Nilasera ? fulgida*, de Nicéville, Journ. A. S. B., vol. lii, pt. 2, p. 80, n. 21, pl. ix, figs. 3, *male*; 3a, *female* (1883); *Satadra fulgida*, Moore, Journ. A. S. B., vol. liii, pt. 2, p. 41 (1884).

HABITAT: Philippines (*Hewitson*); N. India (*Moore*); Sikkim; Khasi Hills.

EXPANSE: ♂, 1·6 to 1·9; ♀, 1·4 to 1·7 inches.

DESCRIPTION: "FEMALE. UPPERSIDE, *both wings* dark brown, the centre from the base to beyond the middle brilliant ultramarine-blue. UNDERSIDE, *forewing* pale rufous-brown the apex tinted with lilac; the base, a broad band at the end of the cell (attached to it), and the transverse band, which is broad and of equal breadth except at its termination, rufous-brown. *Hindwing* lilac, crossed near the base by a broad transverse band, and before the middle by a narrower oblique band; a large suffused spot of dark rufous-brown towards

the outer margin; two short bands of paler brown near the anal angle; two black spots near the outer margin crowned with *gold*."

"Near *A. apidanus*, Cramer; but differs from it considerably in the position of the spots of the hindwing." (*Hewitson*, l. c.)

"MALE. UPPERSIDE, *both wings* rich dark purple, the outer margins very narrowly black. *Tail* black, short, tipped with white. UNDERSIDE, *forewing* with the basal area dark rich brown, beyond pale brown; a pale quadrate spot near the end of the cell, then a broad dark brown band from the costa to the first median nervule, then a narrower pale band, and lastly an even dark band also from the costa to the first median nervule; an apical decreasing violet patch, the outer margin dark brown. *Hindwing* with a narrow dark brown streak from the costa, then a broader pale violet streak, then a still broader dark brown streak; a dark brown streak from the costa to the first median nervule closing the cell, with a spot beyond; another streak beyond much diffused anteriorly, a black spot crowned with golden yellow scales on the margin in the first median interspace, and a similar larger one at the anal angle, with a smaller one attached to it outwardly. FEMALE, *both wings* with the middle only purple of a brighter and lighter shade than in the male. UNDERSIDE, *both wings* as in the male." (*de Nicéville*, l. c.)

This beautifully distinct species occurs somewhat commonly in Sikkim. Mr. Otto Möller possesses specimens taken in Sikkim in June, July, and October; and the Revd. Walter A. Hamilton has sent me numerous specimens from the Khasi Hills. As far as I know, it occurs nowhere else, though Mr. Hewitson has recorded it from the Philippines, most probably in error.

I give below* a description of the very closely-allied *A. singhapura*, Distant, which occurs in the island of Singapore.

812. **Arhopala artegal**, Doherty.

Flos artegal, Doherty, Journ. A. S. B., vol. lviii, pt. 2, p. (1889).

HABITAT: Mergui, Burma.

EXPANSE: ♂, 1·4 inches.

DESCRIPTION: "MALE. UPPERSIDE, *both wings* with the base azure, darkening outwardly to violaceous-blue, quite violet in some lights; on the *forewing* the blue colour occupies less than half of the surface, the black border reaching the upper angle of the cell, and extending unusually far up the inner margin; the margin is outwardly rounded. *Hindwing* with a blue area from the costal nervure and first subcostal nervule to the submedian nervure, its outer margin irregular, the black border wide. UNDERSIDE, *forewing* light brown, the costal half glossed with violet, a large triangular violet-whitish area (somewhat as in the genus *Elymnias*, Hübner, of the subfamily *Elymniinæ*) on the costa near the apex; three wide dark violet-brown transverse bands, edged with paler; one in the cell; the second across its end, extending from the second subcostal to the first median nervule; the third oblique, unbroken, with

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* *Arhopala singhapura*, Distant. *Panchala singhapura*, Distant, Rhop. Malay., p. 273, n. 2, woodcut n. 84, *female* (1885). HABITAT: Singapore. EXPANSE: *Male* and *female*, 1·6 to 1·7 inches. DESCRIPTION: "MALE. UPPERSIDE, *both wings* dark violaceous-blue. *Cilia* dark fuscous. UNDERSIDE, *both wings* violaceous-brown, with the following dark purplish-brown markings and fasciæ:—*forewing* marked as in *P.* [=*A.*] *diardi*, Hewitson. *Hindwing* with a basal costal spot, a broad transverse fascia crossing the wing at the basal third, followed by a medial fasciate spot extending from the costal nervure to the base of the first median nervule, where it is connected with an upper spot situated between the median and the submedian nervures; other markings as in *P. diardi*, save that the anal angular greenish marginal spots are situated in a broad dark purplish-brown patch; ground-colour much more violaceous than that of the forewing. FEMALE. UPPERSIDE, *both wings* much paler violaceous-blue than in the male. *Forewing* with the costal and outer margins (broadest at the apex and extending to the upper disco-cellular nervules) broadly dark fuscous. *Hindwing* with the costal, outer and abdominal margins dark fuscous. UNDERSIDE, *both wings* as in the male."

"This species is closely related to *P. diardi*, as may be seen by comparing the figures here given, the specific differences being most emphatically illustrated by the distinct markings on the underside of the hindwing. It is also *very* closely allied to the Philippine species, *P. fulgida*, Hewitson, from which it is most readily discriminated by the much larger bluish area on the upperside of the wings in the *female*." (*Distant*, l. c.)

I have seen a male only of this species collected in Singapore by Mr. W. Davison. It is indistinguishable from that of *A. fulgida*, Hewitson, from Sikkim. As I have not seen a female of *A. singhapura*, I cannot say if the larger extent of blue coloration on the upperside is a good specific character. I very much doubt that it is, as I find, in the large series of females of *A. fulgida* in my possession, that this character is a very variable one, some specimens having nearly twice as much blue on the upperside as others.

straight sides, from the costa to the third median nervule, continued irregularly almost to the first median nervule ; the outer margin, except at the apex, dark ; a marginal blackish line. *Hindwing* very deep chocolate-brown ; a paler, violet-glossed band, edged by a paler line, across it from the costa to the submedian nervure, crossing the cell ; beyond this a dark transverse band ; apex with a large dark area, its margin violet-whitish ; disc mostly glossed with violet, its lower part irrorated with violet-whitish scales ; a dark submarginal fascia, rather wide and conspicuous subanally ; an obscure metallic-green and black ocellus in the first median interspace, and one on the lobe, the green extending to the submedian nervure : the wing is slightly scalloped, with a distinct lobe, and a very short tail at the end of the first median nervule."

"In its small size and short tail it differs from the other species of the group." (*Doherty*, l. c.)

813. **Arhopala diardi**, Hewitson.

Amblypodia diardi, Hewitson, Cat. *Lycænidæ* B. M., p. 9, n. 43, pl. v, figs. 51, 52, (if corrected in MS., then figs. 41, 42) *male* (1862) ; id., Druce, Proc. Zool. Soc. Lond., 1874, p. 107, n. 2 ; *Amblypodia ? diardi*, Butler, Trans. Linn. Soc. Lond., Zoology, second series, vol. i, p. 549, n. 13 (1877) ; *Satadra diardi*, Moore, Journ. A. S. B., vol. liii, pt. 2, p. 41 (1884) ; *Panchala diardi*, Distant, Rhop. Malay., p. 272, n. 1, pl. xxiii, fig. 14, *female* (1885).

HABITAT : India (*Hewitson*), Nahconchaisee, Siam (*Druce*), Penang (*Moore*), Malacca (*Butler*), Singapore (*Distant*) ; Assam.

EXPANSE : ♂, 1·4 to 2·1 ; ♀, 1·6 to 2·0 inches.

DESCRIPTION : " MALE. UPPERSIDE, *both wings* [very deep] violet-blue, the margins with a very narrow brown border. UNDERSIDE, *both wings* light grey-brown. *Forewing* without the usual basal spots ; the base, an irregular medial broad band, and the usual band, which is united with it at its lowest extremity and is very regular and curved outwards at its middle, all rufous-brown. *Hindwing*, which is without any regular band, has the basal spots very large, the anal angle largely irrorated with golden-green, marked with two black spots wide apart." (*Hewitson*, l. c.) " FEMALE. UPPERSIDE, *both wings* dark violaceous-blue. *Forewing* with the costal and outer margins broadly (especially at the apex) dark fuscous. *Hindwing* with the costal and posterior margins fuscous ; apex of *tail* greyish-white. UNDERSIDE, *both wings* violaceous-brown, with the following dark purplish-brown markings and fasciæ margined with greyish :—*forewing* with the basal half of the costal area (somewhat paler), basal half of the cell (somewhat excavated internally), a broad curved and angulated fascia commencing at the end of the brown costal area and terminating at the first median nervule, followed by a more regularly-curved fascia extending from the costa to the first median nervule, and a narrow marginal and submarginal fascia fused together near the apex. *Hindwing* with a basal costal spot, followed by eight very irregularly-sized spots (some more or less fused, and one long and fascia-like extending from the costa to the base of the third median nervule) on the discal half, again followed by an outer dislocated narrow fascia, which is merged in a purplish-brown patch near the apex, a faint lunulate marginal fascia including some very small spots, and three large marginal spots of metallic greenish scales near the anal angle, the first and third of which contain a black spot. *Body* above and beneath more or less concolorous with the wings. *Legs* concolorous, the tarsi greyish." (*Distant*, l. c.)

The only specimens of this species that I have seen are from Assam. Mr. S. E. Peal has sent it from Sibsagar, the Revd. Walter A. Hamilton from near Shillong, and it was obtained by the Dafla Expedition. It is very near to *A. fulgida*, Hewitson, but may be known from that species by the broad subbasal band on the underside of the hindwing being broken up into spots ; the metallic green irrorations at the anal angle are also more numerous and broadly spread, and less brassy in shade. The species has a wide range, occurring from Assam to Singapore, and is replaced in Sumatra by the very closely-allied *A. capeta* of Hewitson.* Mr. Butler notes (l. c.) " This species would, I think, be better placed in *Utica*, Hewitson."

* *Amblypodia capeta*, Hewitson, Ill. Diurn. Lep., Suppl., p. 22, n. 105, pl. (Suppl.) viii, figs. 70, 71, *female* (1878).

This genus contains but a single species, which occurs in Australia. It has densely hairy eyes while all *Arhopalas* have them smooth.

814. **Arhopala camdeo,** Moore.

Amblypodia camdeo, Moore, Horsfield and Moore, Cat. Lep. Mus. E. I. C., vol. i, p. 41, n. 58, pl. i*a*, fig. 6, *female* (1857); id., Hewitson, Cat. *Lycænidæ* B. M., p. 5, n. 23, pl. iii, figs. 25, 26, *male* (1862); *Arhopala camdeo*, Staudinger, Ex. Schmett., p. 280, pl. xcvi, *male* (1888).

HABITAT: Sikkim, Sylhet, Cachar, Assam, Chittagong Hill Tracts.

EXPANSE: ♂, ♀, 2·1 to 2·4 inches.

DESCRIPTION: "MALE. UPPERSIDE, *both wings* pale violet-blue; *cilia* dark brown. *Forewing* with a whitish tint in the middle, a dark mark at the end of the discoidal cell, extreme edge of anterior margin dark brown. *Hindwing* with the *tail*, and a short tuft at anal angle, dark brown; abdominal margin creamy colour. UNDERSIDE, *both wings* buff-brown. *Forewing* having near the base of the discoidal cell a small blackish spot, then a longer square one, and parallelly beyond this another squarish undulated spot; then a series of seven oval and lunate spots across the wing, one between each veinlet, also some irregularly-shaped spots disposed at the posterior side of the median nervure, all these spots being encircled by a narrow white band; near and parallel with the exterior margin are two series of pale white marks, the space between these being of a darkish brown. *Hindwing* with five black spots near the base (these spots on both wings forming a circle); beyond these are three, then two, and afterwards a series of somewhat smaller spots, this series ending upwards to abdominal margin in a long narrow mark, all being encircled as those in forewing; near and parallel with the exterior margin are markings as in the forewing; near anal angle are disposed some patches of black and metallic blue. FEMALE. UPPERSIDE, *both wings* bright cyaneous, with a broad blackish anterior and exterior margin. [*Forewing* with the white discal area larger than in the male, the disco-cellular spot larger and darker.] *Hindwing*, anal angle with two or three cyaneous lunar-shaped marks; abdominal margin of a creamy colour; *body* dark brown. UNDERSIDE, *both wings* as in the male." (*Moore*, l. c.)

Occurs in the Sikkim tarai (but not in the hills) in July and August, it is also found at Jalpaiguri and eastwards throughout Assam, and the late Mr. H. M. Parish obtained it in July in the Chittagong Hill Tracts. It appears to be confined to the lower hills and the country at their feet. It is one of the largest, most beautiful, and distinct species, and cannot be mistaken for any other. It appears to be fairly common where it occurs, but is so delicate that it is hardly ever obtained in perfect condition.

815. **Arhopala opalina,** Moore.

Nilasera opalina, Moore, Proc. Zool. Soc. Lond., 1883, p. 531, pl. xlix, fig. 1, *male*.

HABITAT: Khasia Hills.

EXPANSE: ♂, 1·5 inches.

DESCRIPTION: "MALE. UPPERSIDE, *both wings* pale purplish lilac-blue. *Cilia* cinereous-grey. UNDERSIDE, *both wings* pale lilacine greyish-brown. *Forewing* with a white-bordered brown mark within the cell, a broad similarly-coloured mark beyond the cell, and a chain-like discal band, beyond which are two marginal slender, indistinct, whitish lunular lines; posterior border of the wing greyish-white. *Hindwing* with three transverse basal, four subbasal, one disco-cellular, and a curved series of eight discal white-bordered brown spots, beyond which are two marginal whitish lunular lines, with a green-speckled anal spot." (*Moore*, l. c.)

I have not seen this species. From Mr. Moore's figure, it appears to be a miniature *A. camdeo*, Moore, but on the upperside is of a rather different shade, more lilac than blue, and lacks the irrorated discal white patch in the forewing which is present in *A. camdeo*. The spots on the underside are less distinct, and are not outwardly defined with a fine white line as in *A. camdeo*. In the forewing is a spot at the base of the discoidal cell, a large quadrate one in the middle, a still larger similar one at the end, with a small spot at its inner lower angle at the base of the first median interspace; the discal band consists of seven spots, the series slightly broken and shifted inwardly below the third median nervule. It is quite unlike any species known to me, and should be easily recognised if met with.

816. **Arhopala wimberleyi**, de N.

Nilasera wimberleyi, de Nicéville, Proc. Zool. Soc. Lond., 1887, p. 462, pl. xl, fig. 4, *female*.

HABITAT : South Andaman Isles.

EXPANSE : ♀, 1·65 inches.

DESCRIPTION : "FEMALE. UPPERSIDE, *both wings* rich cerulean blue. *Forewing* with the costa as far as the subcostal nervure, the apex, and outer margin widely black. *Hindwing* with the costal and outer margin less broadly black, that colour ascending a short distance into the blue colour between the veins ; abdominal margin whitish ; *tail* black, tipped with white. UNDERSIDE, *both wings* pale olivaceous. *Forewing* with a round spot at the base, an oval one at the middle, and a quadrate one at the end of the cell, with a small one between these two latter placed on the subcostal nervure ; a spot at the base of the first median interspace, and another quadrate one in the middle of the submedian interspace ; a discal regular macular band composed of six conjoined spots from the costa to the first median nervule, its inner edge almost straight, its outer edge scalloped ; a submarginal macular band very prominent about its middle : all these markings fuscous, outwardly defined with sordid white ; a fine black anteciliary line. *Hindwing* with the usual spots and bands, the chief of which are two series each of four round spots towards the base, an elongated spot closing the cell, and a much broken discal macular band ; all these spots composed of a pale centre, then a narrow black line, outwardly defined with a pale line ; beyond the discal macular band is a fuscous diffused fascia, outwardly defined from the abdominal margin to the second median nervule by a pale lunular line ; in the next two interspaces the fuscous fascia almost reaches the margin and encloses two of the pale lunules ; a series of black marginal lunules between the veins ; a fine anteciliary black line ; the very small anal lobe with a deep black round spot, with a few obsolete silvery scales crowning it ; a few also in the two next interspaces. *Cilia* of the colour of the ground throughout."

"Apparently nearest to the *Amblypodia ocrida* of Hewitson,* from which it differs in the colour of the upperside, that species being 'silvery cerulean blue ;' there also appears to be some difference in the details of the markings of the underside." (*de Nicéville*, l. c.)

This is a rare species, of which I have seen two specimens only, both sent to me by Mr. R. Wimberley. The male has yet to be discovered.

817. **Arhopala dodonæa**, Moore.

Amblypodia dodonæa, Moore, Horsfield and Moore, Cat. Lep. Mus. E. I. C., vol. i, p. 43, n. 65, pl. ia, fig. 8 (1857) ; *Panchala ? dodonæa*, Butler, Proc. Zool. Soc. Lond., 1886, p. 364, n. 32 ; *P. dodonæa*, id., Ann. and Mag. of Nat. Hist., sixth series, vol. 1, p. 144, n. 37 (1888) ; *Panchala dodonea*, Moore, Proc. Zool. Soc. Lond., 1882, p. 252.

HABITAT : Western Himalayas.

EXPANSE : ♀, 1·3 to 1·8 inches.

DESCRIPTION : "FEMALE. UPPERSIDE, *forewing* with the discoidal cell and posterior base blue, palest in the middle of the disc, and intersected by dark veinlets, the rest of the wing dusky-brown. *Hindwing* with the middle blue, outer margin brown, anterior and abdominal margins paler. UNDERSIDE, *both wings* dark cream-colour. *Forewing* paler posteriorly, with an ill-defined band near the outer margin, then a broad [discal] undulating band, and some spots of a darker shining tint. *Hindwing* also with an ill-defined but more angulated band near the outer margin, then two series of undulating lines, and also spots at the base of the wing. Shape of the wings as in *A. querceti* [= *A. rama*, Kollar], but the exterior margin of the forewing more angulated." (*Moore*, l. c. in Cat. Lep. Mus. E. I. C.)

Mr. Butler notes (l. c. in Proc. Zool. Soc. Lond.) that "This species in Mr. Kirby's Catalogue is indicated as female of the following [*P. rama*] ; in our series are both sexes of each species, which are totally different."

"The distinction between *P. dodonæa* and *P. rama* has never hitherto (to my knowledge) been called in question ; the two species are easily separable. Both sexes of *P. dodonæa* have

* Ill. Diurn. Lep., *Lycænidæ*, p. 14*b*, n. 85, pl. iii*a*, figs 38, 39 (1869) ; from Mindanao, one of the Philippine Islands.

the pattern of the female *P. rama*, but are above of a shining lilac-blue colour, whereas both sexes of *P. rama* are of a deep purplish-ultramarine colour; on the underside, moreover, *P. dodonæa* is of a pale brown or whitish stone-colour, with well-defined dusky markings on the forewing, whereas *P. rama* is of a rosy-lilac colour, indistinctly banded with bronze-brown." (*Butler*, l. c. in Ann. and Mag. of Nat. Hist.)

From Mr. Butler's remarks on the distinctness of *A. rama* and *A. dodonæa*, no one should have any difficulty in identifying either of them. The male of *A. rama* can at once be distinguished from the female by the greater extent of purple coloration on the upperside, but in *A. dodonæa*, according to Mr. Butler, both sexes have an equal extent of blue coloration, a very unusual feature in species of this genus. As far as I know, both species always occur together in the Western Himalayas; the shape of the wings, the position and shape of the markings of the underside is exactly the same in both, and I have always had a strong suspicion that the female of *A. rama* is dimorphic, and that the rarer form of this dimorphism is *A. dodonæa*. To settle the matter, it will only be necessary for a careful observer to ascertain by an examination of the anal organs of freshly-caught specimens of *A. dodonæa*, if there are any males amongst them, if there should not be, and all should as I should expect, prove to be females, there would then be no doubt that we have one species only, and that the female is dimorphic. I have examined the anal organs of numerous dried specimens, always selecting the smallest as the most likely to be males, but all have been females. It may also be remarked that the female of *A. rama* has the outer margin of the forewing scalloped, while the male has it entire. Every *A. dodonæa* I have seen has it scalloped.

A. dodonæa is a much rarer species than *A. rama*, and occurs in oak woods in the outer Himalayas from Murree to Naini Tal; I have repeatedly caught the two together in Simla with one sweep of the net. It has not so far been found in Sikkim or Burma, where *A. rama* is met with.

818. Arhopala anthelus, Doubleday and Hewitson.

Amblypodia anthelus, Doubleday and Hewitson, Gen. Diurn. Lep., vol. ii, p. 478, n. 5, pl. lxxiv, fig. 6, *male* (1852); id., Hewitson, Cat. *Lycænidæ* B. M., p. 5, n. 22, pl. iii, figs. 23, 24, *female* (1862); *Satadra anthelus*, Moore, Journ. A. S. B., vol. liii, pt. 2, p. 39 (1884); *Narathura anthelus*, Distant, Rhop. Malay, p. 263, n. 3, pl. xxiii, fig. 4, *female* (1885).

HABITAT: Moulmein (*Westwood*); Sungei Ujong, Malacca (*Distant*); Upper Tenasserim, Mergui.

EXPANSE: ♂, 2·2 to 2·4; ♀, 2·2 inches.

DESCRIPTION: MALE. UPPERSIDE, *both wings* most magnificent resplendent rich metallic blue. *Forewing* with the costa narrowly, the apex more widely, and the outer margin again narrowly black. *Hindwing* with the costa broadly, the outer margin very narrowly, the anal lobe and just beyond again broadly black; the abdominal margin broadly brownish. UNDERSIDE, *forewing* with a large prominent dark spot below the median nervure before the base of the first median nervule; otherwise as in the female. "FEMALE. UPPERSIDE, *both wings* violaceous-blue. *Forewing* with the costal margin, apex, and outer margin broadly fuscous, the fuscous coloration also continued in a disco-cellular streak at the end of the cell. *Hindwing* with the costal margin broadly and the posterior margin more narrowly fuscous; *tail* with the apex greyish-white. UNDERSIDE, *both wings* pale brownish, with the following dark purplish or pale brown spots and fasciæ margined with greyish:—*Forewing* with two looped spots in the cell and a subquadrate spot at the end of the cell, a fractured macular fascia between the end of the cell and the outer margin, which is strongly dislocated at the third median nervule; between this fascia and the base are a series of large irregular costal spots, a small spot beneath the cell between the bases of the second and first median nervules, and a more obscure and narrow, macular, submarginal fascia. *Hindwing* with an irregular series of five subcostal spots, beneath which are four smaller basal spots, a very irregular discal fascia extending from the second subcostal nervule to the abdominal margin, and an outer pale, waved fascia extending from the outer subcostal spot to the abdominal margin; three transverse,

metallic greenish spots more or less shaded with black near the anal angle, where the outer margin is narrowly greyish. *Body* above and beneath, with *legs*, more or less concolorous with the wings." (*Distant*, l. c.)

The male of *A. anthelus* is the most magnificent species of the genus occurring within Indian limits, the blue of the upperside almost rivalling some of the South American *Morphos*. It is a very rare species; I have seen but a single specimen taken by Major C. T. Bingham in April in the Upper Thoungyeen Forests in Upper Tenasserim, and a pair from Mergui obtained during the cold weather by Mr. W. Doherty.

819. **Arhopala anarte**, Hewitson.

Amblypodia anarte, Hewitson, Cat. *Lycænidæ* B. M., p. 5, n. 20, pl. iii, figs. 16, 17, *male* (1852); id., Druce, Proc. Zool. Soc. Lond., 1873, p. 353, n. 9; id., Doherty, Journ. A. S. B., vol. lviii, pt. 2, p. (1889).

HABITAT: Myitta, Burma (*Doherty*), Malacca interior (*Felder*), Borneo, Makassar (*Druce*).

EXPANSE: ♂, 2·55 inches.

DESCRIPTION: "MALE. UPPERSIDE, *both wings* brilliant silvery blue, tinted with lilac near the margins; the margins with a very narrow border of black. UNDERSIDE, *both wings* with the basal spots large, the usual transverse band represented by a chain of spots, which commence at the middle of the costal margin and curve round towards the middle of the outer margin, five in number, where they are succeeded by three other spots at a greater distance from the margin. *Hindwing*, the anal angle has three black spots irrorated with silvery-blue." (*Hewitson*, l. c.)

Mr. Doherty obtained a single male only of this most beautiful species. Mr. Hewitson did not know the locality of his type male specimen, the female which he subsequently described from Sumatra as *A. anarte* is quite a different species, and has been named *A. agnis* by Dr. Felder. Hewitson's figure of the male gives the blue coloration of the upperside of too light a shade; the disc of both wings is very brilliant light blue, gradually shading off into the darker purple outer margin of both wings and costa of the forewing. The spots of the underside are larger than in any species occurring in the Indian region, of a shade of brown a little darker than the ground-colour, outwardly prominently defined with whitish. In the forewing there is a large spot at the base of the cell, a still larger transverse one at the middle of the cell, with a spot above it reaching the costal nervure, slightly divided by the first subcostal nervule; a very large quadrate spot at the end of the cell, its outer edge twice indented where it is crossed by the discoidal nervules, with a small elongated spot above it; a narrow elongated spot below the cell at the base of the second median interspace, another elongated much larger spot at the base of the first median interspace, a figure-of-eight spot just within the base of the first median nervule, with a small round spot below it touching the submedian nervure; lastly an oval spot near the base of the submedian interspace; a much curved discal series of seven spots, of which the five upper ones are oval and gradually increase in size to the fifth, the sixth and seventh are a little out of line and somewhat kidney-shaped; a submarginal regular series of inconspicuous elongated spots. In the hindwing the spots are arranged almost exactly as in *A. agnis*, Felder, but are a little larger. Both wings are distinctly glossed with purple.

The single male obtained during the cold season of 1888-89 in the Tenasserim Valley by Mr. Doherty is the only specimen I have seen of this species.

820. **Arhopala subfasciata**, Moore.

Nilasera subfasciata,* Moore, Proc. Zool. Soc. Lond., 1883, p. 532, pl. xlix, fig. 2.

HABITAT: Tavoy, Tenasserim Valley, Burma.

EXPANSE: ♂, 1·5; ♀, 1·8 inches.

DESCRIPTION: MALE and FEMALE. "UPPERSIDE, *both wings* pale purplish cobalt-blue. *Forewing* with a purple-brown band curving from base of costa broadly before the apex to

* Mr. Moore described also a *Narathura subfasciata* (p. 267), which fortunately is a synonym of another species, otherwise the present species would have to be renamed, as I am unable to separate the two genera *Narathura* and *Nilasera*. The system I have adopted, as far as possible, in naming new species never to use a specific name which has been used before for Butterflies, appears to me to have several advantages.

posterior angle. *Hindwing* with a paler brown costal and outer marginal band. UNDERSIDE, *both wings* purplish-brown. *Forewing* with a white ringlet and two cross bars within the cell, followed by two irregular white bars from the end of the cell, an irregular chain-like discal band and interrupted submarginal lunules; two brown spots below the cell, with the discal interspaces white. *Hindwing* with two basal white ringlets, two within the cell, a letter-V mark above it, a ringlet beneath the cell, two discal, very irregular curved chain-like bands, and two indistinct submarginal lunular lines; anal angle blackish, speckled with green scales; a prominent white fascia traversing the wing from the abdominal margin below the cell to the apex." (*Moore*, l. c.)

My knowledge of this species is confined to a single male in the collection of Lieutenant E. Y. Watson, who captured it at Beeling, Upper Tenasserim, on 9th April, 1886. The coloration of the upperside is pale, slightly metallic-blue. On the underside of the hindwing it may be known from all the other Indian species of the genus by having a broad whitish streak below the costa at right angles to the body, anterior to which the ground is darker than on the rest of the wing. Altogether the species can hardly be mistaken for any other.

Since the above was written, I have seen a male and two females of this species, taken by Mr. W. Doherty during the cold weather, at Myitta in the Tenasserim Valley. The female is a little larger than the male, and has the costal and outer black border to the forewing on the upperside rather broader. The *A. auxesia*, Hewitson, from Sumatra, and the *A. tephlis*, Hewitson, from Gilolo, have a similar white streak on the hindwing.

821. **Arhopala albopunctata,** Hewitson. (FRONTISPIECE, FIG. 126 ♀).

Amblypodia albopunctata, Hewitson, Ill. Diurn. Lep., p. 14*e*, n. 89, pl. iii*b*, figs. 43, 44, *male* (1869); *Narathura albopunctata*, Moore, Journ. Linn. Soc. Lond., Zoology, vol. xxi, p. 44 (1886).

HABITAT: Burma.

EXPANSE: ♂, ♀, 1·35 to 1·55 inches.

DESCRIPTION: "MALE. UPPERSIDE, *both wings* brilliant cerulean-blue. *Cilia* rufous. *Forewing* with the costal and outer margins very slightly [narrowly] brown. *Hindwing* with a white line before the cilia. UNDERSIDE, *both wings* rufous-brown, with numerous lines and minute spots of white. *Forewing* with four white lines within and one at the termination of the cell, a bifid white spot at the apex. *Hindwing* with three white spots more conspicuous than the rest near the basal half of the costal margin, and two black spots crowned with blue at the anal angle. FEMALE. UPPERSIDE, *both wings* do not differ from those of the male, except that they are of a paler dull blue, and that the apex of the *forewing* is broadly brown." (*Hewitson*, l. c.)

This most lovely species is of a resplendant metallic light blue colour on the upperside in the male, reminding one at once of a South American *Morpho* in miniature. The markings of the underside in both sexes are quite *sui generis*, consisting of fine, bluish-white, prominent short lines occupying the entire surface. The female is not metallic on the upperside, and has two or three oval black spots in the hindwing on the margin towards the anal angle. In the Phayre Museum, Rangoon, is a female taken at Mergui in August; Dr. J. Anderson obtained it at Mergui in November and December, at Pataw Island in January, and on Sullivan Island also in January, all in the Mergui Archipelago; Major C. T. Bingham obtained a male on the Donat range in April, another male in the Thoungyeen Forests in March, and a female in the latter locality in December, all in Upper Tenasserim; lastly Mr. Hewitson recorded it from Moulmein. It appears to be confined to Burma.

Mr. W. Doherty records the following note regarding *A. albopunctata*:—"This species, like *A. theba*, Hewitson, and *A. arouya*, Hewitson, from the Philippines, and a beautiful undescribed Celebesian species, mimic the genus *Lampides*, Hübner, both on the upper- and underside, resembling *L. elpis*, Godart, and its allies. Another *Arhopala* (*critala*, Felder, from the Moluccas) mimics the *danis* group of *Cyaniris* most faithfully."

The figure shows both sides of a female specimen in the Indian Museum, Calcutta, captured in the Mergui Archipelago.

A. lycænaria, Felder, occurs in the Malay Peninsula and Borneo, and is closely allied to *A. albopunctata*, Hewitson, taking its place in that region apparently. It differs from that species on the underside in apparently possessing fewer white markings, and in these being not so broken up and disintegrated, and as figured the metallic green area at the anal angle of the hindwing is of greater extent. I append its description as a foot-note.* I have not seen it.

A. buxtoni, Hewitson, from Malacca, Sumatra, and Borneo, is very closely allied to *A. albopunctata*, Hewitson. Judging from Hewitson's figure of a female, it is a shorter broader insect, and the outer black margin to the forewing on the upperside is differently shaped, its inner edge instead of being regularly curved as in *A. albopunctata* suddenly becoming much narrower below the third median nervule. The markings of the underside do not appear to be quite as disintegrated as in *A. albopunctata*. I append its description as a foot-note.†

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* *Arhopala lycænaria*, Felder. *Amblypodia lycænaria*, Felder, Wien. Ent. Monatsch., vol. iv, p. 396, n. 8 (1860); id., Hewitson, Cat. *Lycænidæ* B. M., p. 12, n. 54 (1862); id., Druce, Proc. Zool. Soc. Lond., 1873, p. 354, n. 12; *Arhopala lycænaria*, Felder, Reise Novara, Lep., vol. ii, p. 232, n. 258, pl. xxix, fig. 13, *male* (1865); *Narathura lycænaria*, Distant, Rhop. Malay., p. 269, n. 15, woodcut n. 79, *male* (1885). HABITAT: Malacca interior (*Felder*), Penang, Singapore (*Distant*), Borneo (*Druce*). EXPANSE: *Male*, 1·5 inches. DESCRIPTION: "MALE, shortly tailed. UPPERSIDE, *both wings* pale violet-blue with a slight silvery sheen, the costa and margins very narrowly fuscous. *Hindwing* with a very small fine blue line in the narrow fuscous anal border. UNDERSIDE, *both wings* light fuscous. *Forewing* with the interior margin slightly paling off, with the following whitish marks:—four straightish transverse lines, three in the cell, and the fourth disco-cellular; a small line beyond the cell, a pair of marks below the median nervure, two very short small streaks near the upper end of the cell, two small subcostal streaks, other small streaks arranged in a double series, and forming a chain-like fascia which is broken at the third median nervule, and finishes at the first median nervule. *Hindwing* with the following whitish-fuscous markings:—six incomplete irregular annular marks, four at the base, a fifth in the cell, a sixth below the costa; a pair of lines one on each side of the disco-cellular nervule, a small line intermediate between these and the first median nervule, a double series of exterior small streaks forming a broken chain-like fascia; also three black anal spots bordered inwardly with metallic blue, and within these are three black lunules inwardly bordered with whitish."

"The colour of the upperside, similar to that of *A. epimuta*, Boisduval, Hewitson, and the pattern of the underside and texture of the wing, which remind one of *Lycæna pluto*, Fabricius [=*Jamides bochus*, Cramer] and its allies, yet remove this insect proportionately from all hitherto known species of the group of *A. muta*, Boisduval." (*Felder*, l. c. in Reise Novara.)

"MALE. UPPERSIDE, *both wings* brilliant morpho-blue, the margins with a narrow border of brown. UNDERSIDE, *both wings* brown, crossed by numerous irregular lines of lighter brown. *Hindwing*, anal angle with two black spots irrorated with silvery-blue." (*Hewitson*, l. c.)

"MALE. UPPERSIDE, *both wings* bright shining cerulean-blue; costal and outer margins narrowly fuscous. UNDERSIDE, *both wings* brownish, with the following greyish lines or fasciæ and spots:—*forewing* with two pairs of transverse lines in the cell (one at the base and one near the middle), and a similar pair at the end of the cell; above the last are two placed close together, and almost reaching the costa; a pair beneath the cell situated on each side of the first median nervule; between the cell and the outer margin is a curved fascia, strongly dislocated at the nervules, commencing at the second subcostal nervule, and terminating at the first median nervule, and a submarginal row of small greyish spots placed between the nervules. *Hindwing* with two basal spots, and the whole disc covered with transverse fasciæ more or less dislocated and fused; three black spots with metallic greenish scales near the anal angle. *Body* and *legs* more or less concolorous with the wings."

"I have not seen a female specimen, but in the male sex the species is rendered very distinct from any of those preceding and here enumerated [except *A. anthelus*, Doubleday and Hewitson, but Mr. Distant had not seen a male of the latter at the time of writing], by the *metallic* cerulean-blue of the upperside of the wings. As it is now recorded from Penang, Malacca, and Singapore, *N.* [=*A.*] *lycænaria* is probably generally distributed throughout our area." (*Distant*, l. c.)

† *Arhopala buxtoni*, Hewitson. *Amblypodia buxtoni*, Hewitson, Ill. Diurn. Lep., Suppl. p. 22, n. 104, pl. viii, Suppl., figs. 68, 69, *female* (1878); *Narathura buxtoni*, Distant, Rhop. Malay., p. 454, n. 20, pl. xliv, fig. 18, *female* (1886). HABITAT: Malacca, Sumatra, Borneo. EXPANSE: *Male* and *female*, 1·4 to 1·6 inches. DESCRIPTION: "MALE. UPPERSIDE, *both wings* brilliant lilac-blue, the margins narrowly brown. UNDERSIDE, *both wings* rufous-brown, crossed by many spots and linear bands of paler colour. *Hindwing* with one tail and three black spots at the base, crowned with metallic blue. FEMALE. UPPERSIDE, *both wings* like the male, except that it is of a paler blue, and has the outer margin of the *forewing* broadly dark brown." (*Hewitson*, l. c.)

"MALE. UPPERSIDE, *both wings* bright violaceous-blue, the margin somewhat narrowly dark fuscous. *Hindwing* with a greyish line near the anal angle, the abdominal area greyish brown. UNDERSIDE, *both wings* pale brownish, with the following greyish lines or fasciæ:—*Forewing* with three pairs of subcostal lines, the last pair somewhat irregularly continued across the wing towards the first median nervule, where there is also a small brown spot surrounded with greyish, two broken submarginal lines, three pairs of lines crossing the cell, two (small) lines above the cell, and three lines beneath the cell. *Hindwing* with some basal spots, and crossed by a number of irregular greyish lines, some small submarginal greyish spots, and three black spots shaded with metallic green at the anal angle; *tail* with its apex greyish. *Body* and *legs* more or less concolorous with the wings. FEMALE. UPPERSIDE, *both wings* as in the male, but with a wider dark margin, especially at the apices of the wings. UNDERSIDE, *both wings* as in the male." (*Distant*, l. c.)

Neither Mr. Hewitson nor Mr. Distant say that the male of this species is metallic on the upperside, but I think I may assume that it is so. Both these writers unfortunately figure the female only. Mr. Distant says that he has "here arranged this species after *N.* [= *A.*] *lycænaria*," Felder, to which it is evidently nearly allied by the shape of the wings and the character of the markings on the underside. Hewitson figures the female of a very pale lilac on the upperside, Distant of a deep violaceous-blue, the former is probably the more correct. I have seen no specimen of this species.

822. **Arhopala eumolphus**, Cramer.

Papilio eumolphus, Cramer, Pap. Ex., vol. iv, p. 19, pl. ccxcix, figs. G, H, *male* (1780); id., Herbst, Pap., pl. ccxcviii, figs. 3, 4, *male* (1804); *Polyommatus eumolphus*, Godart, Enc. Méth., vol. ix, p. 652, n. 120 (1823); *Amblypodia eumolphus*, Horsfield, Cat. Lep. E. I. C., p. 103, n. 35 (1829); id., Hewitson, Cat. *Lycænidæ* B. M., p. 8, n. 36, pl. viii, fig. 89, *male* (1862); *A. bupola*, Hewitson, Ill. Diurn. Lep., Suppl., p. 21, n. 102, pl. vii, Suppl., figs. 64, 65, *female* (1878); *Satadra bupola*, Moore, Journ. A. S. B., vol. liii, pt. 2, p. 38 (1884); id., de Nicéville, Journ. A. S. B., vol. liv, pt. 2, p. 4, n. 302 (1885).

HABITAT: Bengal Coast (*Cramer*), Java (*Horsfield*), Sikkim (*Hewitson*), Nepal (*Moore*), Assam, Chittagong Hill Tracts.

EXPANSE: ♂, 1·6 to 2·1; ♀, 1·7 to 2·0 inches.

DESCRIPTION: "MALE. UPPERSIDE, *both wings* deep emerald-green, with a rich golden refulgence, spreading over the surface to a deep black border, which is narrow and regularly defined in the forewing, broader and indented in the hindwing. UNDERSIDE, *both wings* brown, in some individuals inclining to gray. *Forewing* with a series of three successively larger dark brown spots in the medial area surrounded with pearly shining rings, the first near the base being smallest, the exterior one on the disc constituting a short broad band bordered with white undulated marginal lines; the contiguous portion of the anal area marked with two oblong tapering obliquely diverging spots of the same colour; behind the disc follows a broad dark brown complete fascia, broken in the middle, with white undulated edges, and finally, parallel with the margin, a more obscure band with paler grayish undulations. *Hindwing* with six or seven oval or irregularly round dark brown spots, narrowly edged with gray, disposed in two successive interrupted rows near the base; next, a more prominent transverse band, of the same colour, simple and broad in the costal area, subdivided into two parallel branches, in the medial and anal area; behind this an obsolete band parallel with the margin, faintly undulated with gray, and succeeded in the anal region by three deep black oblong lunular spots, arranged in regular succession close to the margin, the interior one being somewhat larger and marked with an intensely black subocellate spot, the whole being confined along the inner edge by a waving emerald-green band richly covered with irrorations of a golden lustre. *Body* above agrees in colour with the adjoining portion of the wings, and below is covered with a light gray down. *Antennæ* brown to the middle and ferruginous towards the extremity. The intermediate *tail* is slender, tipt with gray, and the lateral tails are very minute." (*Horsfield*, l. c.) "FEMALE. UPPERSIDE, *both wings* rufous-brown, with a lilac-blue spot from the base. *Hindwing* with one tail. UNDERSIDE, *both wings* pale rufous-brown, with several spots before the middle, a spot at the end of the cell, a transverse band beyond the middle (broken on the forewing), all brown bordered with paler colour; both with a submarginal brown band, zigzag on the hindwing. *Hindwing* with three black caudal spots, crowned with gold-green."

"This species and *A. bazaloides*, [Hewitson, habitat unknown], though closely allied to *A. bazalus*, Hewitson, are sufficiently well-marked as varieties, if not good species." (*Hewitson*, l. c. of *A. bupola*.)

Specimens of the female of this species from Sikkim "differ from Hewitson's figure of *S. bupola* in having an additional spot on the costa just beyond the spot closing the cell on the underside of the forewing." (*de Nicéville*, l. c.) With reference to this last remark of mine, I find on an examination of thirty-one examples in Mr. Otto Möller's collection, twenty-one in my own collection, and some few others, that this spot is usually present, but it varies much in size, and in some examples is entirely absent as in the specimen figured by Hewitson. I have found that this character is equally variable in the male. Hewitson, in describing the female, does not mention though he figures the patch of purple on the hindwing on the upperside which is always more or less present in this species. Dr. Horsfield describes the female as follows, and says in one place that Cramer figured that sex, and in another the male:—"FEMALE. UPPERSIDE, *both wings* black, the greenish-golden lustre being limited, in the *forewing* to a medial patch extending to the base, and in the *hindwing* to a triangular spot occupying the basal areolet." Either in Java this species has a female coloured like the male, or Dr. Horsfield described males of two species as opposite sexes of one species; the latter is much the more probable. I have no doubt whatever

that *A. eumolphus* and *A. bupola* are opposite sexes of one species ; I have examined large series of both, and find that all the males are green and all the females are purple ; besides, the markings of the underside are absolutely identical. In all localities in India where one is found the other also is met with. *A. eumolphus* is a fairly common species at low elevations in Sikkim ; Mr. Otto Möller possesses specimens taken in October and November. It occurs throughout Assam, and the late Mr. H. M. Parish took it in the Chittagong Hill Tracts in November.

823. **Arhopala farquhari,** Distant.

Narathura farquhari, Distant, Rhop. Malay., p. 264, n. 5, pl. xxiii, fig. 3, *male* (1885) ; *Amblypodia eumolphus*, Butler (*nec* Cramer), Trans. Linn. Soc. Lond., Zoology, second series, vol. i, p. 548, n. 2 (1877).

HABITAT : Burma, Malay Peninsula, S.-E. Borneo.

EXPANSE : ♂, 1·7 to 2·1 inches.

DESCRIPTION : " MALE. UPPERSIDE, *both wings* bright golden-green. *Forewing* with the costal margin narrowly, and the outer margin more broadly, dark fuscous. *Hindwing* with the costal, posterior and abdominal margins dark fuscous, the posterior widest and continued in rays along the median nervules ; apex of *tail* greyish-white. UNDERSIDE, *both wings* brownish, with spots and fasciæ margined with greyish. *Forewing* with two spots in the cell, one transverse at the end of the cell reaching the third subcostal nervule, a small spot between the bases of the second and third subcostal nervules, two spots beneath the cell divided by the first median nervule, a macular fascia between the end of the cell and the outer margin, strongly dislocated at the third median nervule, a submarginal and a more obscure marginal fascia. *Hindwing* with seven basal spots ; two medial transverse macular fasciæ dislocated and united into one from the second subcostal nervule to the costal nervure, marginal and submarginal fasciæ as on the forewing, but more obscure, and three transverse metallic greenish spots, more or less marked with black, near the anal angle. *Body* above and beneath, including *legs*, more or less concolorous with the wings."

" This species has hitherto been confounded with the *N.* [=*A.*] *eumolphus* of Cramer, but a reference to that author's figure will at once dispel any ground of misunderstanding, it having the outer discal transverse fascia to the forewing straight and not strongly dislocated as in this species. Cramer also gives the ' Coast of Bengal' as its habitat." (*Distant*, l. c.)

Mr. Distant (l. c., p. 463) describes the female of *A. farquhari* as follows :—" FEMALE. UPPERSIDE, *both wings* resembling the male in hue, but the *forewing* with a broad costal and outer marginal dark fuscous fascia ; this dark colour being broadest at the apex." It is probable that the specimen above described is the male of quite a distinct species ; it is impossible that it can be the female of *A. farquhari.*

Mr. Doherty has written the following note on *A. farquhari* :—" This species seems to be quite distinct from *A. eumolphus*, Cramer, not, as Mr. Distant says, on account of the dislocated transverse band of the forewing, which often [usually] occurs in *A. eumolphus*, but on account of the uniform dull brown colour of the underside, the pale rings enclosing slightly darker brown spots, while in *A. eumolphus* the wings are washed with bronzy-grey, the ground-colour varying in different places [very much as in *A. rama*, Kollar, which has a very similar silky-glossed underside], the spots small and distinct, while the anal green area is usually obsolescent. The female of *A. farquhari* is bright blue over fully half the forewing, its edge serrate, with a wide brown border on both wings, darkening where it borders on and deeply indents the blue subapically. The species is extremely uniform everywhere, and is abundant from Tavoy and Mergui to South-Eastern Borneo."

I admit this species as distinct from *A. eumolphus* with considerable reluctance. Mr. Butler and Mr. Moore* have both failed to recognise its distinctiveness, and I placed the two species together until I had read the above quoted note by Mr. Doherty. It is difficult to

* There are Mergui specimens of *A. farquhari* in the Indian Museum, Calcutta, ticketed *A. eumolphus* by Mr. Moore.

know where the geographical line dividing the two species will come, as a specimen from the Chittagong Hill Tracts is certainly typical *A. eumolphus* ; while from Mergui and Tavoy, which are a little south of this, *A. farquhari* is found. Another differential character not mentioned by Mr. Doherty, but exhibited by the five specimens of *A. farquhari* before me, is that the outer black border on the upperside of the forewing in the latter species is half as wide as is usually found in *A. eumolphus*.

A description of *A. maxwelli*, Distant, will be found below.* It is probably the female of *A. farquhari*. The blue coloration on the upperside is much more extensive than in the female of *A. eumolphus*, Cramer.

I give below† a description of *A. trogon*, Distant, from the Malay Peninsula, which is a very distinct species allied to *A. eumolphus*, Cramer, and still nearer to *A. aurea*, Hewitson.

824. **Arhopala hellenore**, Doherty.

A. hellenore, Doherty, Journ. A. S. B., vol. lviii, pt. 2, p. (1889).

HABITAT : Mergui, Burma.

EXPANSE : ♂, 1·9 inches.

DESCRIPTION : "MALE. UPPERSIDE, *both wings* with the green colour rather more tinged with golden than in *A. eumolphus*, Cramer, and the dark border somewhat narrower on the forewing, and much narrower on the hindwing, extending less than one-third towards the base of the first median interspace. UNDERSIDE, *both wings* conspicuously marked with whitish,

* *Arhopala maxwelli*, Distant. *Narathura maxwelli*, Distant, Rhop. Malay., p. 263, n. 4, pl. xxiii, fig. 10, *female* (1885). HABITAT : Malacca. EXPANSE : 2·0 inches. DESCRIPTION : "FEMALE. UPPERSIDE, *both wings* violaceous blue. *Forewing* with the costal and outer margins (abruptly widened at apex) dark fuscous. *Hindwing* with the costal and outer margins dark fuscous ; abdominal margin fuscous, *tail* with its apex greyish-white. UNDERSIDE, *both wings* brownish. *Forewing* with the following spots and fasciæ margined with greyish :—two spots in, and one at the end of the cell ; above this last is a small and obscure spot ; a curved macular fascia between the end of the cell and the outer margin, commencing near the costa, abruptly dislocated at the third median nervule, from which it is continued by three fused spots, the uppermost smallest ; two spots beneath the cell divided by the first median nervule, and a submarginal waved fascia. *Hindwing* with seven basal spots ; two transverse, waved, discal fasciæ dislocated and fused from the second subcostal nervule to the costal nervure, a waved submarginal fascia as on the forewing, and three metallic greenish spots, more or less shaded with black near the anal angle. *Body* above and beneath, with *legs*, more or less concolorous with the wings." (*Distant*, l.c.)

Mr. Distant (l. c., p. 463) describes the female of his *Arhopala farquhari* as green on the upperside like the male. In this I am sure he is wrong, and think it very probable that the true female of *A. farquhari* is the species now under discussion, a close comparison of the figure of the underside of *A. maxwelli* and specimens of *A. farquhari* disclosing no differences of any moment. I have not seen a specimen of *A. maxwelli*.

† *Arhopala trogon*, Distant. *Panchala trogon*, Distant, Ann. and Mag. of Nat. Hist., fifth series, vol. xiv, p. 201 (1884) ; idem., id., Rhop. Malay., p. 275, n. 5, woodcut n. 87, *male* (1885) : p. 464, n. 5 (1886). HABITAT : Perak. EXPANSE : *Male*, 1·7 ; *female*, 1·5 inches. DESCRIPTION : "MALE. UPPERSIDE, *both wings* bright metallic emerald-green ; nervures and nervules, extreme margin of the forewing ; costal area, abdominal area, and posterior margin—narrowing from the apex to the third median nervule, and then broadly to the anal angle—of the hindwing dark chocolate-brown ; *cilia* and short *tail* of the same colour, the latter with its apex greyish. UNDERSIDE, *both wings* purplish brown, the lower half of the forewing almost without the purplish reflections. *Forewing* crossed by the following greyish lines :—two looped and macular crossing the cell, two disco-cellular at the end of the cell (the innermost continued to the first median nervule), two discal, waved and fractured, commencing near the costa and terminating at the first median nervule, and two submarginal, which are narrow and somewhat obsolete ; from the base of the first median nervule to the inner margin is a narrow greyish line, from which to the outer angle the colour is greyish, and before which is a small greyish spot. *Hindwing* darker purplish, the basal area beneath the median nervure clothed with long brownish hairs, and with the following greyish lines :—four macular, arranged in transverse basal series, followed by three macular, situated one above and one within the cell, and one irregular in shape beneath the cell : these are followed by about four, much waved and fractured, crossing the disc of the wing, and a waved marginal line from apex to second median nervule, where there are three blackish spots, much covered with metallic greenish scales and outwardly bordered with greyish, extending to the anal angle. *Body* above brownish, beneath and *legs* somewhat paler. FEMALE. UPPERSIDE, *both wings* violaceous-blue. *Forewing* with the whole costal area above the cell, the apex very broadly and irregularly—almost approaching the apex of the cell, which has a disco-cellular spot—and the outer margin also broadly blackish. *Hindwing* blackish, with the disc violaceous blue. UNDERSIDE, *both wings* as in the male."

"This species is allied to both the *N.* [=*A.*] *farquhari*, Distant, and the *P.* [=*A.*] *aurea*, Hewitson (a Bornean species), by the metallic emerald-green colour above : it is, however, very distinct from both, not only by the different markings beneath, but also by the much smaller brownish markings on the upperside of the wings." (*Distant*, l. c. in Rhop. Malay.)

In this case Mr. Distant admits that the green male *Arhopala* can have a purple female and I have no doubt that this is invariably the case. The type male specimen of this very beautiful and distinct species is in the Indian Museum, Calcutta. It is a narrower-winged insect than *A. eumolphus*, the green colour of the upperside is more brassy, and in the forewing extends quite up to the margins, leaving a black marginal thread only. The markings of the underside are quite different in the two species, the discal band of the forewing in *A. trogon* being unbroken ; the tail also is quite short and tooth-like.

which forms a large apical mass on the hindwing in which the transverse markings are very distinct, and crosses both wings in an obscure discal band. *Hindwing* with the subanal metallic green markings obsolescent. The dark markings are large, as in *A. farquhari*, Distant, from which it seems quite distinct, though it may be the local Tenasserim form of *A. eumolphus*." (*Doherty*, l. c.)

Mr. Doherty has described this species from a single worn specimen. As he considers *A. farquhari* to be distinct from *A. eumolphus*, it is inevitable that he should treat the specimen under discussion as a third distinct species. The three species form a graduated series as regards the extent of the green coloration on the upperside in the male; *A. hellenore* has the greatest extent of green and *A. eumolphus* the least, with *A. farquhari* about intermediate between them.

825. **Arhopala moelleri**, de N.

Nilasera ? moelleri, de Nicéville, Journ. A. S. B., vol. lii, pt. 2, p. 80, n. 22, pl. ix, figs. 4, *male*; 4*a*, *female* (1883); *Satadra lazula*, Moore, Journ. A. S. B., vol. liii, pt. 2, p. 40 (1884).

HABITAT: Sikkim; Khasi Hills; Sibsagar, Upper Assam.

EXPANSE: ♂, 1·40 to 1·80; ♀, 1·80 inches.

DESCRIPTION: "MALE. UPPERSIDE, *both wings* magnificent shining ultramarine blue, the costa and outer margin of the *forewing* and the outer margin of the *hindwing* narrowly black, the costa of the latter wing more widely black; three short black *tails*, the middle one in continuation of the first median nervule rather longer than the other two, and tipped with white. UNDERSIDE, *both wings* dark rich brown. *Forewing* marked exactly as in *N. ?* [=*A.*] *adriana*, de Nicéville, except that the discal chain of pale spots is less broken in the middle. *Hindwing* with a narrow pale purple streak at the base, then a broad dark brown band, followed by a pale purple irregular streak, and irregular pale purple and dark brown spots and streaks on the disc; a submarginal waved dark brown line, which is lost towards the apex in a large diffused patch of the same colour; three subanal black spots almost covered with iridescent green scales; a fine anteciliary dark line. *Cilia* pale, dark at the end of the nervules. FEMALE. UPPERSIDE, *both wings* dark brown, with a patch of purple in the middle, very restricted in the *hindwing*. UNDERSIDE, *both wings* as in the male."

"The male of this species on the upperside is exactly of the same tint of resplendent blue as *N. ?* [=*A.*] *areste*, Hewitson, which also occurs in Sikkim, but the black marginal border is very considerably narrower. The markings of the underside are quite different." (*de Nicéville*, l. c.)

This magnificent species together with *A. areste* are only surpassed in the beauty of the blue coloration on the upperside of the male by *A. anthelus*, Doubleday and Hewitson, and its allies. Both sexes have the costal base of the forewing on the underside, the palpi, the frontal tuft, and the collar of the head, deep brick red, therein resembling *A. apidanus*, Cramer. It is a rare species in Sikkim, and occurs in July and August. I append Mr. Moore's description of the species, which was published very shortly after my own.*

A. anniella, Hewitson, from the Malay Peninsula, is apparently nearest allied to *A. moelleri*, like it having the tail to the hindwing very short and tooth-like. Its description is appended.†

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* *Satadra lazula*, Moore, Journ. A. S. B., vol. liii, pt. 2, p. 40 (1884). HABITAT: Sikkim. EXPANSE: *Male* and *female*, 1·8 inches. DESCRIPTION: "MALE. UPPERSIDE, *both wings* entirely ultramarine-blue. *Forewing* with the extreme costal edge black. *Hindwing* with the costal and abdominal borders black. *Cilia* black. UNDERSIDE, *both wings* dark purple-brown. *Forewing* with similarly disposed but broader markings than those in *S. chola*, Moore [=*A. asoka*, de Nicéville], the two outer bands purplish-violet. *Hindwing* dark purple-brown, with similar markings to those in *S. chola*, the discal bands continuous, the interspaces brighter pink, the anal marginal spots small and more numerously green-speckled. FEMALE. UPPERSIDE, *both wings* dark violet-brown. *Forewing* with ultramarine-blue within the cell and obliquely below on the disc, and narrowly on the middle of the *hindwing* from the base of the cell. UNDERSIDE, *both wings* as in the male." (*Moore*, l. c.)

† *Arhopala anniella*, Hewitson. *Amblypodia anniella*, Hewitson, Cat. *Lycænidæ* B. M., p. 10, n. 46, pl. viii, figs. 83, 84, *male* (1862); *Narathura anniella*, Distant, Rhop. Malay., p. 269, n. 14, pl. xxi, fig. 20, *male* (1885). HABITAT: Singapore (*Hewitson*), Province Wellesley, Perak, Sungei Ujong (*Distant*). EXPANSE: *Male*, 1·60 to 1·75 inches. DESCRIPTION: "MALE. UPPERSIDE, *both wings* intense ultramarine-blue,

826. **Arhopala andamanica,** W.-M. and de N. (PLATE XXVII, FIG. 199 ♂).

Amblypodia (? *Narathura*) *fulla*, var. *andamanica*, Wood-Mason and de Nicéville, Proc. A. S. B., August, 1881, p. 143, n. 6; *Narathura fulla*, var. *andamanica*, id., Journ. A. S. B., vol. l, pt. 2, p. 251, n. 78 (1881); *N. subfasciata*, Moore, Trans. Ent. Soc. Lond., September, 1881, p. 312.

HABITAT: South Andaman Isles.

EXPANSE: ♂, 1·4 to 1·6; ♀, 1·4 to 1·6 inches.

DESCRIPTION: "MALE. UPPERSIDE, *both wings* brilliant violet-cyaneous, slightly more broadly bordered with black-fuscous than in Hewitson's figure of *N.* [=*A.*] *fulla*. UNDERSIDE *both wings* pale ochraceous-fuscous, with faint traces of a disco-cellular mark and of three or four basal spots in the hindwing, besides the markings beyond the middle of the wings, darker than the ground-colour. The end of the first median nervule of the hindwing forms a minute tooth on the outer margin." FEMALE. UPPERSIDE, *forewing* differs from the male only in having the costal margin broadly, the apex and outer margin still more broadly, black, the blue coloration of a different shade. *Hindwing* with the costa and outer margin more broadly black than in the male. UNDERSIDE, *both wings* as in the male.

"This very slight variety seems intermediate between *N.* [=*A.*] *fulla*, Hewitson, from Boirou, and *N.* [=*A.*] *arsenius*, Felder, from Luzon." (*Wood-Mason* and *de Nicéville*, Journ. A. S. B., l. c.). I now believe this species to be quite distinct from *A. fulla*, Hewitson, which has the inner margin of the forewing much shorter than the costa, while *A. andamanica* has these parts of nearly equal length, and the forewing consequently truncated, with the apex much less acute. The outer black margin to the forewing is also considerably broader in *A. andamanica*. I append a description of *A. fulla*.*

A. andamanica appears to be rather common in South Andaman, the late Mr. A. R. de Roepstorff having sent four males and a female to the Indian Museum, Calcutta, while Mr. R. Wimberley has enriched my collection with numerous specimens of both sexes. I also append a description† of this species by Mr. Moore, who discriminated it within a month of

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the margins witb a very narrow border of black. UNDERSIDE, *both wings* varied with brown and grey. *Forewing* rufous-brown, the costal margin near tbe apex grey; the base, the costal margin to its middle, with two short bands projecting from it, and the usual transverse hand wbich curves outwards at its middle, where it is widest, and becomes narrower to its lower extremity (ending before the first median nervule), all dark brown. *Hindwing* crowded with dark brown spots intersected with grey." (*Hewitson*, l. c.)

"MALE. UPPERSIDE, *both wings* dark violaceous-blue, costal and outer margins narrowly darker. UNDERSIDE, *forewing* pale castaneous with an ochraceous tinge, and with the following dark castaneous spots and fasciæ narrowly margined with greyish:—a spot crossing the cell near tbe middle (the basal portion of the cell is also dark castaneous), a short broad fascia at the end of tbe cell joined to a spot beneath the cell and terminating at the first median nervule; this is followed at a short distance by another fascia commencing nearer the costa and terminating in a spot between the second and first median nervules, and an outer marginal fascia, becoming obsolete towards the outer angle; between these fasciæ, but particularly at the apex of the wing, tbere is a strongly developed steely-blue tinge. *Hindwing* dark castaneous, witb the following spots and fasciæ margined with steely-blue lines; a looped costal spot near the base and terminating near the subcostal nervure, this is connected with three discal fasciæ, which are also more or less fused at tbe extreme margins, and tbe uppermost of which is dislocated at tbe median nervure, and the lowermost is narrowest and strongly tinged on each side on the lower half of the wing with steely blue; a small black marginal spot witb some metallic greenish scales between the second and first median nervules, and another near the anal angle. *Body* above and beneath, with *legs*, more or less concolorous with the wings. FEMALE. UPPERSIDE, *both wings* paler in bue than those of the male, and with the margins (especially at the apex of the forewing) broadly dark fuscous. UNDERSIDE, *both wings* as in the male."

Mr. Distant remarks that the figures of this species given by Hewitson do not at all agree with the figure he (Distant) gives, adding "I could not have believed that I possessed the species had I not carefully compared my specimens with Hewitson's type. There can be no doubt that in the Eastern *Lycænidæ* Hewitson's figures are, in several cases, in direct antithesis to his typical specimens, which being now contained in the National Collection, must be accepted as decisive." (*Distant*, l. c.)

Mr. Hewitson's figure of this species is obviously very bad, but even worse in my eyes than the delineation of the markings of tbe underside is tbe shape given to tbe forewing, which is represented as much elongated and pointed at tbe apex, quite unlike any known species of this genus. I have seen no specimen of *A. anniella*.

* *Amblypodia fulla*, Hewitson, Cat. *Lycænidæ* B. M., p. 10, n. 47, pl. vi, figs. 67, 68, *male* (1862). HABITAT: Boirou. EXPANSE: *Male*, 1·6 inches. DESCRIPTION: "MALE. UPPERSIDE, *both wings* bright lilac-blue, the margins with a narrow border of brown. UNDERSIDE, *both wings* ferruginous, *spotless to beyond the middle*. *Forewing* with the usual band straight, narrow, and indistinct, followed by a submarginal band. *Hindwing* crossed beyond the middle by a broad regular rufous band, followed between it and the outer margin by three other bands of the same colour." (*Hewitson*, l. c.)

† *Narathura subfasciata*, Moore, Trans. Ent. Soc. Lond., 1881, p. 312. HABITAT: Andamans. EXPANSE: *Male, female*, 1·5 incbes. DESCRIPTION: "MALE. Near to *N. canuta* [=*canulia*], Hewitson. UPPERSIDE, *both wings* glossy purplish-blue; margins narrowly black. UNDERSIDE, *both wings* pale greyish-brown. *Forewing* witb two very indistinct, slightly darker, submarginal fasciæ. *Hindwing* with two similar lunular fasciæ, a broader discal zigzag fascia, and three or four small basal spots. FEMALE. UPPERSIDE, *both wings* of a more cobalt-bluc tiut, which is confined to the lower basal arca." UNDERSIDE, *both wings* as in the male. (*Moore*, l. c.)

the publication of Mr. Wood-Mason's and my description. He compares the species with *A. canulia*, Hewitson, from the Philippines, a description of which I give below also.* It is much nearer to *A. fulla* than to *A. canulia.*

The figure shows both sides of a male specimen from the Andaman Isles in my collection.

827. Arhopala paramuta, de N.

Panchala ? paramuta, de Nicéville, Journ. A. S. B., vol. lii, pt. 2, p. 81, n. 23, pl. ix, figs. 7, *male*; 7a, *female* (1883); *Darasana newara*, Moore, l. c., vol. liii, p. 42 (1884); id., Waterhouse, Aid, pl. clxv, figs. 4, 4a, *male* (1885).

HABITAT: Nepal, Sikkim.

EXPANSE: ♂, 1·3 to 1·4; ♀, 1·2 to 1·3 inches.

DESCRIPTION: "MALE. UPPERSIDE, *both wings* glossy purple. *Forewing* with the costa narrowly, and outer margin widely black. *Hindwing* with only the middle purple, the rest black. UNDERSIDE, *both wings* pale brown, all the markings of a slightly darker shade with paler edges. *Forewing* with an obscure round spot near the base of the cell, a reniform one in its middle, and another at its end; a spot at the base of the first median interspace, and another below the point where the first median nervule is given off; two costal spots; a discal very even chain of seven spots, a submarginal lunulated band and marginal spots. *Hindwing* with the markings arranged very evenly over the whole surface; a subbasal line of four round spots, succeeded by three larger spots also in line, then a bifurcated discal chain-like irregular series; marginal markings as in the forewing. FEMALE. UPPERSIDE, *forewing* differs from the male only in the purple area being more restricted. UNDERSIDE, *both wings* with the markings rather more prominent. No *tail.*" (*de Nicéville*, l. c.)

A rather common species in Sikkim, occurring in April and May. Mr. Moore described this species independently as below† soon after the publication of my description.

828. Arhopala zeta, Moore.

Amblypodia zeta, Moore, Proc. Zool. Soc. Lond., 1877, p. 590, pl. lviii, fig. 6, *female*; *Saladra zeta*, id., Journ. A. S. B., vol. liii, pt. 2, p. 41 (1884).

HABITAT: South Andaman Isles.

EXPANSE: ♀, 1·12 inches.

DESCRIPTION: "FEMALE. UPPERSIDE, *both wings* brilliant cobalt-blue, apex and outer borders broadly black. UNDERSIDE, *both wings* light umber-brown. *Forewing* with two pale-bordered darker spots within the cell, two beyond, and a discal row of five spots. *Hindwing* with two basal rows each of four pale-bordered darker spots, a discal duplex series of similar spots, and two marginal rows of pale-bordered dentate marks." (*Moore*, l. c. in Proc. Zool. Soc. Lond.)

See remarks on the next species.

829. Arhopala roona, Moore.

Narathura roona, Moore, Journ. A. S. B., vol. liii, pt. 2, p. 42 (1884).

HABITAT: Andaman Isles.

EXPANSE: ♀, 1·3 inches.

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* *Amblypodia canulia*, Hewitson, Ill. Diurn. Lep., p. 14f, n. 91, pl. iiic, fig. 54, *male* (1869). HABITAT: Philippines. EXPANSE: *Male*, 1·95 inches. DESCRIPTION: "MALE. UPPERSIDE, *both wings* violet-blue, the margins narrow, dark brown. UNDERSIDE, *both wings* green-grey. *Forewing* with two indistinct bands near the outer margin, and some submarginal spots of brown. *Hindwing* crossed beyond the middle by three bands and some submarginal spots of grey-brown, the space between the first and second bands tinted with white, the third band bordered below with white marked by a black spot." (*Hewitson*, l. c.)

† "*Darasana newara*, Moore, Journ. A. S. B., vol liii, pt. 2, p. 42 (1884). HABITAT: Nepal. EXPANSE: 1·2 inches. DESCRIPTION: "UPPERSIDE, *both wings* violet-brown. *Forewing* with the basal and discal areas purplish violet-blue, which extends also above the cell to near the costal edge, the outer brown border being about one-tenth of an inch in width. *Hindwing* with the basal area purplish violet-blue, the outer border being two-tenths of an inch in width. UNDERSIDE, *both wings* pale brown. *Forewing* with faint traces of pale-bordered marks within and beneath the cell, at its end, and a more distinct narrow macular discal and submarginal lunular band. *Hindwing* with four indistinct pale-bordered darker brown basal spots, a similar subbasal series, a discal broken band, and marginal double lunular band" (*Moore*, l. c.) Mr. Moore does not state what sex he described, but it was probably a male.

DESCRIPTION : "Closely allied to but smaller than *N.* [=*A.*] *aroa,* Hewitson, from Sumatra. FEMALE. UPPERSIDE, *both wings* dark violet-brown, costal edge and *cilia* paler. *Forewing* with the basal and discal areas violet-blue. *Hindwing* with the basal and medial discal areas violet-blue. UNDERSIDE, *both wings* of a similar tint of brown to that of *N. aroa,* markings also similarly disposed, but with darker centres. *Forewing,* cell-spots smaller and oval in shape, and the discal band broader. *Hindwing,* basal spots more rounded, the discal band more conspicious and less zigzag in shape, and the submarginal and marginal lunular line more distinctly formed ; at the anal angle is a black spot, and another between the median nervules, the spots and intervening space being speckled with metallic-green scales." (*Moore,* l. c.)

The type specimen of this species, together with four others, two of which Mr. Moore has himself named, are before me as I write. I cannot imagine how Mr. Moore could have written the last part of the above description, as in none of these specimens are there any black marginal spots on the underside of the hindwing, nor any trace, even under a very powerful magnifying glass, of metallic green scales.

Mr. Moore described the preceding species, *A. zeta,* from a female, and this species from a specimen of the same sex. Both occur in the Andamans, their size is nearly the same, no difference in the markings of the underside is traceable on comparing the description of *A. zeta* with the type specimen of *A. roona,* the only point of distinction between the two appearing to be that *A. zeta* is (described as) "brilliant cobalt-blue" on the upperside, while *A. roona* is "violet-blue." It is so extremely difficult to hit off in words the multitudinous variations in tint of blue and purple occurring in the genus *Arhopala* that I doubt very much if this colour-difference is of specific value. It is very strange that Mr. Moore should have compared *A. roona* with *A. aroa,* seeing that the latter has tails, is much larger, and the male is described as having a very narrow outer black margin on the upperside. It will be found described in a foot-note on page 244. Mr. Moore places *zeta* in the genus *Saladra,* which is supposed to be tailed though his figure shews that it has no tail. I have a strong suspicion that *A. zeta* and *A. roona* are one and the same species, but, as I have seen no authenticated specimen of the former, I keep them distinct for the present.

A. roona appears to be rather a rare species. I have seen five specimens only, three of which have passed through Mr. Moore's hands, and been named by him.

830. **Arhopala tounguva,** Grose Smith. (PLATE XXVII, FIG. 198 ♂).

Amblypodia tounguva, Grose Smith, Ann. and Mag. of Nat. Hist., fifth series, vol. xx, p. 268 (1887).

HABITAT : Toungu, Burma ; Andaman Isles.

EXPANSE : ♂, ♀, 1·5 to 1·9 inches.

DESCRIPTION : "MALE. UPPERSIDE, *both wings* brilliant blue. *Forewing* with the apex, costa from near the base, and exterior margin broadly brown-black. *Hindwing* with the exterior margin broadly brown-black. UNDERSIDE, *both wings* pinkish-brown, slightly suffused with purple. *Forewing* with two spots in the cell and one beyond the cell, followed by a broad straight band of contiguous spots, the spots all being brown bordered with lighter pinkish-brown, a broad brown patch below and beyond the cell and exteriorly almost to the base, beneath which the space to the inner margin is pale brown. *Hindwing* with numerous brown spots bordered with light pinkish-brown. FEMALE. UPPERSIDE, *both wings* paler than in the male, and the margins less broadly black." (*Grose Smith,* l. c.)

I am much indebted to Mr. Grose Smith for a pair of this species from the typical locality. I also possess two males from Rangoon, and the Indian Museum, Calcutta, possesses two females from the same locality. Mr. R. Wimberley has sent me two males from the Andamans. The opposite sexes are almost exactly alike, but in the female the purple coloration on the upperside of the forewing does not extend into the upper discoidal interspace, while in the male it extends fully one-tenth of an inch along that space. The markings of the underside are very like those of *A. roona,* Moore, but the discal band on the underside of the forewing

in the latter is narrower, more macular, and has its edges deeply scalloped ; the latter also is a smaller insect.

The figure shews both sides of a male specimen from Rangoon in my collection.

A. inornata, Felder, apparently belongs to this group.* It does not appear to have been recognised since it was first described.

831. Arhopala asopia, Hewitson.

Amblypodia asopia, Hewitson, Ill. Diurn. Lep., p. 14*f*, n. 90, pl. iii*c*, figs. 50, 51 (1869).

HABITAT : Moulmein.

EXPANSE : 1·7 inches.

DESCRIPTION : " UPPERSIDE, *both wings* blue or lilac-blue. *Forewing* with the costal margin rufous-brown, the outer margin broadly dark brown. *Hindwing* with the apex and outer margin rufous-brown. UNDERSIDE, *both wings* rufous, the basal spots small. *Forewing* with the transverse band (except at the lowest spot) unbroken, the submarginal band broad and distinct. *Hindwing* with the transverse band much broken and indistinct." (*Hewitson*, l. c.)

I have not seen this species. From Hewitson's figure it appears to be of a very pale shade of blue on the upperside, the costa broadly at the base, then decreasing to the middle, brown ; then increasing to the apex (where it is widest), thence decreasing to the inner angle, black, so as to form a rather broad black margin, which is one-tenth of an inch wide in the middle of the outer margin. In the hindwing the black border is very wide at the apex, decreasing in width to the anal angle, its inner edge waved, its middle portion about one-twentieth of an inch in width. The underside as pictured is of a very unusual tint of reddish-ochreous, the spots brown, outwardly defined by pale ochreous. It has no metallic irrorations on the hindwing at the anal angle on the underside. The sex of the type specimen is not stated. In everything but the mere tone of coloration on both surfaces, it agrees with *A. tounguva*, Grose Smith.

832. Arhopala perimuta, Moore.

Amblypodia perimuta, Moore, Horsfield and Moore, Cat. Lep. Mus. E. I. C., vol. i, p. 42, n. 61 (1857) ; id., Hewitson, Cat. *Lycænidæ* B. M , p. 12, n. 55, pl. vi, figs. 65, 66, *male* (1862) ; idem, id., Ill. Diurn. Lep., Suppl., p. 21, n. 62, pl. vii, Suppl., fig. 61, *male* (1878) ; *Darasana perimuta*, Moore, Journ. A. S. B., vol. liii, pt. 2, p. 42 (1884) ; idem, id., Journ. Linn. Soc. Lond , Zoology, vol. xxi, p. 44 (1886).

HABITAT : Sikkim ; Sylhet ; Khasi Hills ; Magaree, Pegu ; Mergui.

EXPANSE : ♂, ♀, 1·20 to 1·42 inches.

DESCRIPTION : " MALE. UPPERSIDE, *both wings* glossy purple, with a narrow black border on the exterior margins. UNDERSIDE, *both wings* brown, glossed over with purple.

* *Arhopala inornata*, Felder. *Amblypodia inornata*, Felder, Wien. Ent. Monatsch., vol. iv, p. 396, n. 7 (1860) ; id., Hewitson, Cat. *Lycænidæ* B.M., p. 12, n. 53 (1862); *Arhopala inornata*, Felder, Reise Novara, Lep., vol. ii, p. 234, n. 261, pl. xxix, fig. 12, *male* (1865) ; *Narathura inornata*, Distant, Rhop Malay., p. 271, n 17, woodcut n. 81, *male* (1885). HABITAT : Malacca interior. EXPANSE : *Male*, 1·8 inches. DESCRIPTION : "*Male*. UPPERSIDE, *both wings* deeply tinted with cyaneous, a fuscous margin before the cilia. UNDERSIDE, *both wings* very pale fuscous. *Forewing* becoming paler towards the inner margin ; with the following spots :—two annular in the cell, a third median, a fourth interior, a fifth disco-cellular ; an exterior fascia curved chain-like, all these [spots and fascia] rather more deeply tinted than the ground-colour and bordered with a lighter tint, they are not very plainly visible ; there is also a submarginal fascia almost evanescent. *Hindwing* with seven basal spots, annular (the exterior ones rather large), also a disco-cellular fascia, and an exterior fascia slightly chain-like, which is broken at the second subcostal and at the first median nervules, and bent upwards posteriorly, and also another fascia submarginal, rather macular and decreasing in width, these are all a little deeper in tint than the ground-colour, and margined with a much lighter tint ; there is a faint ante-marginal line. FEMALE. UPPERSIDE, *both wings* much more diluted in tint. *Forewing* with a fuscous costal border, passing on to the posterior margin, very broad at the apex, then decreasing much, rather arched within. *Hindwing* with a fuscous costal border, passing on to a very narrow exterior border getting broader towards the anal angle, with the inner margin brownish as in the male. UNDERSIDE, *both wings* exactly as in the male."

"Differs from all other species of the group of *A. muta*, Boisduval, Hewitson [from Java], in the entire absence of the black spots at the anal angle encircled with metallic blue on the underside of the hindwing ; in other respects coming nearest to *A. agelastus*, Hewitson." (*Felder*, l. c. in Reise Novara.) But according to Hewitson's figure and description of *A. muta*, that species has no metallic blue scales at the anal angle of the hindwing on the underside. *A agelastus* possesses these blue scales.

"Is not this species an indistinctly marked variety of *A. hypomuta*, Hewitson." (*Hewitson*, l. c.) I hardly think this suggestion is correct. *A. hypomuta* has four spots on the underside of the forewing towards the base, *A. inornata* has five ; the spots and fasciæ in *A. inornata* are a little darker than the ground-colour, while in *A. hypomuta* they are much darker. Lastly, *A. hypomuta* has prominent metallic bright blue patches on the anal region of the hindwing, which are entirely absent in *A. inornata*. *A. inornata* does not appear to have been recognised since it was first described.

Forewing pointed at the apex; with two oval marks and an undulating line of a paler colour. *Hindwing* rounded; without tails; with a broad, uneven, and indistinctly-defined fascia of a creamy colour crossing from the anterior to the abdominal margin, also marked with several oval and undulating lines." (*Moore*, l. c. in Cat. Lep. Mus. E. I. C.)

"MALE. UPPERSIDE, *both wings* bright blue, the margins with a border of brown. UNDERSIDE, *both wings* ferruginous, clouded with purple. *Forewing* with the transverse band unusually wide, broadest in the middle, purple. *Hindwing* with the base and outer margin purple." (*Hewitson*, l. c., Cat. *Lycænidæ* B. M., p. 12). FEMALE. UPPERSIDE, *both wings* glossy bluish-purple, with broad outer black margins, the costa of the *forewing* more narrowly black. UNDERSIDE, *both wings* as in the male.

A rare species in Sikkim; Mr. Otto Möller possesses specimens taken in July and December. Mr. Hamilton has obtained it in the Khasi Hills, Mr. H M. Parish at Rungamutti in the Chittagong Hill Tracts in October, Dr. Anderson in the Mergui Archipelago in January and February, and Mr. Doherty at Mergui and Myitta, Tenasserim valley, during the cold weather. The broad pale yellow transverse band across the middle of the hindwing on the underside occupying half the surface renders this little species easily recognisable.

833. **Arhopala duessa**, Doherty.

A. duessa, Doherty, Journ. A. S. B., vol. lviii, pt. 2, p. (1889).

HABITAT: Myitta, Tenasserim valley, Burma.

EXPANSE: ♂, 1·5 inches.

DESCRIPTION. "MALE. UPPERSIDE, *forewing* bright cerulean blue over fully half of the surface, the apex widely, the costa and outer margin moderately, and the veins slenderly black. *Hindwing* with the cell and the extreme base of the first median interspace irrorated with blue scales. UNDERSIDE, *both wings* light brown; the markings violet-brown with violet-whitish irides, only the basal ones annular. *Forewing* with the costal and apical half of the wing, including the upper half of the cell glossed with pale violet; three transverse spots in the cell, a double one in the basal part of the first median interspace, a very broad compact dark transverse discal band unbroken from the costa to the submedian nervure, the apex of the wing with a whitish patch; margin distinctly undulated outwardly. *Hindwing* glossed with pale violet; with basal annular spots, an irregular spot at the end of the cell, outwardly acuminate, and a very irregular transverse discal band, of which the first and second spots are compactly united with the terminal cell-spot, the other five small and separate, forming an irregular chain; an outer discal pale fascia forming a large violet-whitish mass near the apex, the disc also clouded with whitish; an obscure submarginal line of pale violet lunules, the marginal line dark; no metallic subanal markings; no tail, lobe, or undulations.

"Two males, Myitta. I know no species closely resembling this. It may be allied to *A. bazalus*, Hewitson, but has no tail or lobe. The distribution of the blue coloration on the upperside is very unusual." (*Doherty*, l. c.)

834. **Arhopala areste**, Hewitson.

Amblypodia areste, Hewitson, Cat. *Lycænidæ* B. M., p. 10, n. 44, pl. v, figs. 43, 44, *female* (1862); *Nilasera? areste*, de Nicéville, Journ. A. S. B., vol. lii, pt. 2, p. 97, n. 247 (1883); *Satadra areste*, Moore, Journ. A. S. B., vol. liii, pt. 2, p. 41 (1884); *S. patuna*, id., l. c., p. 40.

HABITAT: India (*Hewitson*); Darjiling, Nepal (*Moore*); Sikkim.

EXPANSE: ♂, 1·6 to 2·0; ♀, 1·5 to 1·9 inches.

DESCRIPTION: "FEMALE. UPPERSIDE, *both wings* black, with a large spot of bright blue from the base to beyond the middle. UNDERSIDE, *both wings* light lilac-brown without the basal spots. *Forewing* with the base, an irregular broad medial band, and the usual band, which joins it towards the inner margin and is of equal breadth and curved outwards, all rufous-brown. *Hindwing* with the base purple, the medial band partly formed by indistinct rufous spots." (*Hewitson*, l. c.) "MALE. UPPERSIDE, *both wings* differ from those of the female in having the outer margins only narrowly black, all the rest being a most vivid

ultramarine blue. UNDERSIDE, *both wings* with the markings similar to those of the female." (*de Nicéville*, l. c.)

A rare species in Sikkim, and occurs at low elevations in August, September, and November. It is nearest to *A. moelleri*, mihi, but differs in both sexes in the markings of the underside, there being no red coloration on the head or on the base of the costa of the forewing, no metallic green scales at the anal angle of the hindwing, and no pale violet straight band at the base; the outer margin of the latter wing in slightly toothed also, while in *A. moelleri* it is distinctly tailed. The broad pale transverse discal band across the hindwing on the underside allies this species to *A. perimuta*, Moore, but all other characters separate it widely from that species. Mr. Moore seems to have redescribed this species under the name of *Saladra patuna*. His description is appended.* He has failed to recognise the species under Hewitson's name, as he has ticketed specimens of both sexes of *A. adriana*, mihi, in my collection as "*Saladra areste*."

A. morphina, Distant, from Perak, described below,† has no near Indian ally. It is a magnificent species, with a very curious prominent dark chocolate-brown broad band at the base of the hindwing on the underside, and all the other markings obscure.

835. Arhopala belphœbe, Doherty.

A. belphœbe, Doherty, Journ. A. S. B., vol. lviii, pt. 2, p. (1889).

HABITAT: Myitta, Tenasserim valley, Burma.

EXPANSE: ♂, 1·5 inches.

DESCRIPTION: MALE. UPPERSIDE, *both wings* light, rather dull purple-blue. *Forewing* with the outer black margin wide, especially at the apex. *Hindwing* with the costal and outer margins somewhat broadly black. UNDERSIDE, *both wings* pale brown, strongly glossed with purple, all the spots very annular, but very slightly darker than the ground, outlined with a very clear narrow well-defined violet-white line. *Forewing* with a small spot near the base of the cell, a large oval one at the middle, with a still larger ill-shaped spot below it in the submedian interspace, a large spot at the end of the cell with two small spots below it in the median interspaces; a discal band of five nearly equal-sized very rounded spots, the three upper ones forming a straight line, placed outwardly obliquely, the fourth spot strongly shifted inwardly, the fifth about in a line with the third; a double marginal series of joined lunules. *Hindwing* with three basal spots small and crowded together, a

* *Arhopala patuna*, Moore. *Satadra patuna*, Moore, Journ. A. S. B., vol. liii, pt. 2, p. 40 (1884). HABITAT: Nepal EXPANSE: *Female*, 1·5 inches. DESCRIPTION: FEMALE. "Smaller than *S. lazula*, Moore [=*A. moelleri*, de Nicéville]. UPPERSIDE, *both wings* dark violet-brown, the basal and discal areas purplish-blue, paler than in *S. lazula*, but disposed as in the female of that species. UNDERSIDE, *both wings* purplish-brown. *Forewing* with a similarly-disposed cell-streak, discal band, and lower quadrate patches, but of a pale ochreous colour. *Hindwing* with the basal area broadly and entirely dark bright purple-brown (more like that of typical *S. apidanus*, Cramer) which merges into a transverse broad pale purplish-ochreous inner discal fascia, and again into a dark purplish-brown outer discal fascia, the outer border of the wing being broadly pale purplish-brown; across the disc are traced two series of indistinct brown-lined marks, which are similarly disposed to, but are less continuous than, those in *S. lazula*; an indistinct brown marginal lunular line, but no metallic speckles at anal angle." (*Moore*, l. c.)

Mr. Moore's description agrees in the minutest particulars with females of the species I have identified as *A. areste*, Hewitson.

† *Arhopala morphina*, Distant. *Panchala morphina*, Distant, Ann. and Mag. of Nat. Hist., fifth series, vol. xiv, p. 201 (1884); idem, id., Rhop. Malay., p. 274, n. 4, woodcut n. 86, *male* (1885). HABITAT: Perak. EXPANSE: *Male*, 2·3 inches. DESCRIPTION: "MALE. UPPERSIDE, *both wings* dark shining purplish-blue, the margins (narrowly), nervures, and nervules more or less blackish. *Hindwing* with the abdominal area fuscous. UNDERSIDE, *both wings* pale brownish. *Forewing* with the basal area from the costa to the median nervure, and extending outwardly to a little beyond the cell, darker brown, followed by a waved fascia of the same colour, terminating beneath the second median nervule, where it is narrowest; the outer margin also darker brown, with the apex and extreme margin pale violaceous. *Hindwing* with the basal fourth dark chocolate-brown, with a narrow outer violaceous margin; a small chocolate-brown spot margined with violaceous above the submedian nervure, a narrow waved medial violet-margined fascia crossing the disc, strongly fractured at the end of the cell, and then more narrowly continued to the internal nervure; this is followed by a short and somewhat broken fascia, commencing at the second subcostal nervule and narrowly terminating at the first median nervule, the whole outer margin broadly infuscated, the apex and extreme margin pale violaceous. *Body* and *legs* more or less concolorous with the wings." (*Distant*, l. c. in Rhop Malay.)

Mr. Distant suggests that the absence of the tail to the hindwing of the type specimen of this species is probably due to mutilation. There are two males in the Indian Museum, Calcutta, neither of which show any trace of a tail, so I think it may be safely stated that *A. morphina* comes into the tailless section of the genus.

fourth spot on the abdominal margin separated from the others; the other spots large, the one at the end of the cell irregularly shaped, somewhat triangular, produced outwardly to a point in the first median interspace, as in *A. duessa*, Doherty; the discal band composed of well-formed equal-sized annular spots in slightly united pairs, the middle pair out of line and nearer the margin than the others; marginal lunules as in the forewing. It has no tail or anal lobe.

This species has some resemblance to *A. agesias*, Hewitson, from the Malay Peninsula and Borneo.* Described from a single worn specimen captured during the cold weather.

836. **Arhopala ganesa**, Moore.

Amblypodia ganesa, Moore, Horsfield and Moore, Cat. Lep. Mus. E. I. C., vol. i, p. 44, n. 66, pl. *ia*, fig. 9 (1857); *Panchala ganesa*, Moore, Proc. Zool. Soc. Lond., 1882, p. 252; id., Doherty, Journ. A. S. B., vol. lv, pt. 2, p. 126, n. 121 (1886); *Arhopala ganesa*, Staudinger, Ex. Schmett., p. 281, pl. xcvi, *male* (1888).

HABITAT: Western Himalayas.

EXPANSE: 1·25 to 1·40 inches.

DESCRIPTION: MALE and FEMALE. "UPPERSIDE, *forewing* with the discoidal cell and posterior base sky-blue, the end of the discoidal cell and between the discoidal nervules white, rest of wing dark brown. *Hindwing* sky-blue to near exterior margin, rest brown, abdominal margin and *cilia* paler. UNDERSIDE, *both wings* cream-white. *Forewing* nearly covered with broad undulating brown bands. *Hindwing* with ill-defined undulating bands. Near the outer margin of *both wings* appears a very faint undulated line and a series of dots. Wings shaped as in *A. querceti* [= *A. rama*] and *A. dodonæa*. Without tails." (*Moore*, l. c. in Cat. Lep. Mus. E. I. C.)

Colonel A. M. Lang, R. E., informs me that "there appears to be only one summer brood of this species in Kumaon, appearing in May and June, and confined to 5,500 to 6.500 feet altitude, in forests." The species has a wide range, occurring in Kashmir on the west to Kumaon on the east, always in oak forests, and is rather common. The outline of the hindwing is quite unique, the costa being very sinuous, the apex acute and anteriorly produced. This character is enormously intensified in *Mahathala ameria*, Hewitson, *A. ganesa* being a connecting link between the genera *Mahathala* and *Arhopala*. *A. birmana*, Moore, would appear to be the nearest ally to *A. ganesa* as far as markings go.

The *Amblypodia loomisi* of Pryer (Rhop. Nihonica, p. 11, n. 29, pl. ii, fig. 15 (1886) from Japan, is a very close ally of *A. ganesa*, but appears to have no white on the upperside of the forewing, and the blue restricted to the middle in the hindwing.

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* *Arhopala agesias*, Hewitson. *Amblypodia agesias*, Hewitson, Cat. *Lycænidæ* B. M., p. 11, n. 49, pl. vi, figs. 55, 56, *female* (1862). HABITAT: Selangor, Malay Peninsula; Borneo (*Hewitson*). EXPANSE: *Female*, 1·6 to 1·8 inches. DESCRIPTION: "FEMALE. UPPERSIDE, *both wings* violet-blue, the margins broadly brown. UNDERSIDE, *both wings* brown. *Forewing* with the usual transverse band, represented by four round spots, such as usually occupy the base of the wings. *Hindwing*, the band represented by a chain of eight spots, which commences at the costal margin a little below the middle, and, curving outwards parallel to the outer margin, ends in an oblong spot near the inner margin; the anal angle with three black spots irrorated with bright blue."

"Variety *a*. FEMALE. UNDERSIDE, *forewing* without the transverse band of four round spots." (*Hewitson*, l. c.)

I possess a single female example of this very distinct species from Selangor in the Malay Peninsula. It agrees exactly with the description of the "variety *a*" above. The upperside is of a very rich purplish-blue, forewing with the costa, the outer margin, especially at the apex, very broadly black, the black margin rapidly decreasing in width to the anal angle. Hindwing with the costa and apex broadly black, the outer margin moderately broadly black. Underside rufous-brown, the spots a little darker than the ground, outwardly defined with a pale line; a round spot at the base of the cell; a larger oval one in the middle with a small spot between it and the basal spot above the subcostal nervule, and another small spot attached above to the middle spot in the cell; a large spot closing the cell, with a small spot attached to it above, and another small spot between it and the spot in the middle of the cell, making in all four small spots above but touching the subcostal nervure at about equal distances apart above the cell; no discal band; a small spot at the base of the first median interspace; an obscure submarginal band very broad at the costa, narrowing towards the anal angle, which it does not quite reach. Hindwing may be said to have a complete circle of almost equal-sized rounded spots, thirteen in number, leaving a clump of four spots almost forming a square in the middle of the wing; a marginal series of nine somewhat triangularly-shaped spots, of which the four anal ones are deep black, broadly outwardly defined with rich metallic green scales, the one in the first median interspace separated from the three conjoined spots towards the anal angle.

A. belphœbe, Doherty, differs from *A. agesias* in being of a much bluer shade on the upperside, strongly glossed with vinous on the underside, the ground-colour pale brown not rufous-brown, no black spots at the anal angle of the hindwing spangled with metallic blue. Both these species are quite distinct the one from the other and from all the species with which I am acquainted.

837. **Arhopala birmana,** Moore.

Panchala birmana, Moore, Proc. Zool. Soc. Lond., 1883, p. 531.

HABITAT: Toungu, British Burma.

EXPANSE: 1·37 inches.

DESCRIPTION: "Allied to *P.* [=*A.*] *ganesa*, Moore. MALE. UPPERSIDE, *both wings* with similar blue discal areas, that on the *forewing* being confined more to the base. UNDERSIDE, *both wings* dark brown. *Forewing* with similar but much darker and broader markings, which have whiter borders, the interspace between the second and third cell-spots, and between the latter and the discal band of the same dark brown as the wing, not white as in *P. ganesa*. *Hindwing* with very similar markings, but all dark brown and with white borders, anal lunules blue-speckled. FEMALE. UPPERSIDE, *both wings* with darker blue, extending from the base broadly over the discal area. UNDERSIDE. *Both wings* as in the male." (*Moore*, l. c.)

The points of difference between *A. birmana* (*burmana* would be more correct) and *A. ganesa* seem to me to be greater than the points of resemblance. The much darker colour of the ground on the underside, and the presence of the blue-speckled anal lunules on that side of the hindwing, should make this species of easy recognition to any one possessing specimens of *A. ganesa*. It is quite unknown to me. It is one of the smallest species of this group.

838. **Arhopala moolaiana,** Moore.

Narathura moolaiana, Moore, Proc. Zool. Soc. Lond., 1878, p. 835; *Amblypodia epimuta*, Hewitson (*nec* Moore), Cat. *Lycænidæ* B. M., p. 11, n 51, pl. vi, figs. 59, 60, *female* (1862).

HABITAT: Taoo, 3,000-5,000 feet; Moolai, 3,000-6,000 feet, both in Upper Tenasserim (*Moore*); India (*Hewitson*).

EXPANSE: ♀, 1·75 inches.

DESCRIPTION: "MALE. UPPERSIDE, *both wings* morpho-blue, the margins with a narrow border of brown. UNDERSIDE, *both wings* rufous. *Forewing* with the basal spots scarcely seen, the transverse band of nearly equal breadth, curved out and in. *Hindwing* with the band represented by indistinct spots in pairs, the anal angle with two bright spots of silvery-blue, one large and oblong, the other apart from it and small. FEMALE. UPPERSIDE, *both wings* like the male, except that it is of a lighter blue, with the margins broad." (*Hewitson*, l. c.)

"This is a distinct species from *N. epimuta*, Moore, the type of which is from Borneo." (*Moore*, l. c.)

I have not seen this species. From the description it should be easily recognised. The male is morpho-blue on the upperside with a narrow black border, the female, as figured, is of a very light shade of blue, the black border on the hindwing a full tenth of an inch broad, still broader (especially at the apex) in the forewing and well-defined. The markings of the underside appear to be very regular and well-defined, the discal band of the forewing sinuous, but not broken.

839. **Arhopala pastorella,** Doherty.

A. pastorella, Doherty, Journ. A. S. B., vol. lviii, pt. 2, p.   (1889).

HABITAT: Myitta, Tenasserim valley, Burma.

EXPANSE: ♂, 2·0 inches.

DESCRIPTION: "MALE. UPPERSIDE, *both wings* light cerulean blue, brilliantly metallic, outwardly slightly violaceous and less resplendent. *Forewing* with a slender black line on the costa and outer margin. *Hindwing* blue from the costal to the submedian nervure, a marginal black line. UNDERSIDE, *both wings* rather dark fuscous-brown, the markings darker, bordered by slightly paler lines, only the basal spots annular, the others like parentheses, thus ( ). *Forewing* with three increasing spots in the cell, a transverse spot below it, and one at the base of the first median interspace; the transverse discal band is rather broad, the first four spots

united and compact, the first is small, close to the costa, the second broadest; the fifth and sixth spots dislocated inwardly, compactly united; a submarginal series of obscure dark spots, bordered within and without by obscure paler touches. *Hindwing* with the basal spots of moderate size, annular; a transverse discal series of nine spots in a tolerably regular semicircle, all somewhat annular, none approaching the terminal cell-streak; a submarginal series of obscure dark cordate spots bordered with paler; a slight metallic green streak in the first median interspace, and a similar band from the first median nervule to the submedian nervure, both bordered with black; the anal lobe is small, black; there are slight projections at the ends of the first median nervule and submedian nervure, but no distinct tails, the outer margin is regularly rounded without undulations."

"In the colour of the upperside this butterfly perhaps resembles *A. lycænaria*, Felder, a smaller species and tailed. It is very near *A. agelastus*, Hewitson, but that species is smaller, more violet apically, and not distinctly metallic above; on the underside the transverse bands are more regular, the costal spot of the forewing is absent, and the general colour duller and more fuscous, less rufous." (*Doherty*, l. c.)

A. pastorella has been described from a single example. It is a little larger than *A. agelastus*, the upperside is a little more brilliant, on the underside the coloration is rather less rufous, the discal band of the forewing is more regular; in *A. agelastus* the spot in the lower discoidal interspace is usually much out of line, being projected outwards towards the margin; in some specimens, however, it is quite in line with the rest; the costal spot spoken of by Mr. Doherty is sometimes absent in *A. agelastus*. The last-named species often has in the male traces of a "male-mark." on the disc of the forewing on the upperside, a character wanting in *A. pastorella*. The species is really almost indistinguishable, as far as I can tell from the figure, from *A. moolaiana*, Moore, but the discal band of the forewing on the underside is differently formed, being of nearly equal breadth, curved out and in, in *A. moolaiana*; while in *A. pastorella* the uppermost spot is very small, the second very large, the third and fourth decreasingly smaller, the fifth spot shifted inwardly towards the base of the wing, and the sixth in a line with the fourth.

840. **Arhopala metamuta**, Hewitson.

Amblypodia metamuta, Hewitson, Ill. Diurn. Lep., p. 13, n. 59, pl. ii, figs. 14, 15, *male* (1863); id., Butler, Trans. Linn. Soc. Lond., Zoology, second series, vol. i, p. 548, n. 10 (1877); *Narathura metamuta*, Distant, Rhop. Malay., p. 267, n. 10, pl. xxiii, fig. 19, *male*; (*nec* fig. 18, *male* var.?) (1885); id., Moore, Journ. Linn. Soc. Lond., Zoology, vol. xxi, p. 44 (1886).

HABITAT: Sumatra (*Hewitson*), Malacca (*Butler*), Mergui Archipelago (*Moore*), Tenasserim valley.

EXPANSE: ♂, 1·4 to 1·6; ♀, 1·3 inches.

DESCRIPTION: "MALE. UPPERSIDE, *both wings* with the *margins broad*, dark brown. *Forewing* violet-blue. *Hindwing* brilliant morpho-blue. UNDERSIDE, *forewing* with the *first three spots* of the transverse band *placed obliquely outwards, the other two spots* a little within them and *placed transversely*."

"This species may be readily distinguished from *A. hypomuta*, Hewitson, by the broad margins, and by the different blue of the fore- and hindwings." (*Hewitson*, l. c.)

Mr. Butler, I think quite incorrectly, states that Hewitson erroneously determined the sex of the specimen he described, and redescribed the male as follows:—"MALE. UPPERSIDE, *both wings* deep purple as in the forewing of the female, but without the black border." (*Butler*, l. c.) Mr. Butler's specimen certainly appertains to a different species.

Mr. Doherty has kindly lent me two males of this species taken at Mergui and in the Tenasserim valley in the cold season, and there is a single worn female in the Indian Museum, Calcutta, collected by Dr. J. Anderson on Kisseraing Island in the Mergui Archipelago on 28th December, 1881, which has been identified by Mr. Moore. These are all the specimens I have seen of this species. The male is very easily recognised, owing to the difference in colour between

the forewing and the hindwing, the former being considerably the darker. The markings of the underside are small and regular and not very prominent. The discal band on the underside of the forewing consists of five spots only, the three upper spots are in a straight line and placed outwardly obliquely, the fourth spot is shifted inwardly, the fifth is in a line with the third. The unique female mentioned above is only 1·3 inches in expanse; the upperside is shining blue of the same shade in both wings, of the exact tint of the hindwing of the male ; there is no regular outer black border, but the blue colour gradually merges into the black.

841. **Arhopala hypomuta,** Hewitson.

Amblypodia hypomuta, Hewitson, Cat. *Lycænidæ* B. M., p. 11, n. 52, pl. vi, figs. 63, 64, *male* (1862) : idem, id., Ill. Diurn. Lep., p. 12, n. 58, pl. ii, fig. 13, *male* (1863); id., Druce, Proc. Zool. Soc. Lond., 1873, p. 354, n. 11 ; id., Butler, Trans. Linn. Soc. Lond., Zoology, second series, vol. i, p. 549, n. 11 (1877).

HABITAT : India (*Hewitson*), Borneo (*Druce*), Penang, Malacca (*Butler*).

EXPANSE : ♂, 1·6 inches.

DESCRIPTION : " MALE. UPPERSIDE, *both wings* ultramarine-blue, the margins with a very narrow border of black. UNDERSIDE, *both wings* rufous-brown. *Forewing* with the *band narrow, of equal breadth, formed of five spots, the middle spot projecting outwardly. Hindwing*, crowded with unarranged spots, the anal angle with three black spots marked with bright blue. FEMALE. UPPERSIDE, *both wings* like the male, except that the blue colour is lighter, the margins broadly brown. UNDERSIDE, *forewing* with the spots forming the transverse band differently arranged, *the last spot* (as well as the middle one) *projecting outwards beyond the rest.* I regret that the figure does not represent this species as well as I would wish ; the transverse band of the forewing on the underside is too broad, and the spots which form it are not sufficiently rounded." (*Hewitson*, l. c. in Cat. *Lycænidæ* B. M.)

" I expressed my regret that the figure of this species in the British Museum Catalogue did not represent it to my satisfaction ; the band of the forewing on the underside is there too broad, and does not represent as it ought the projecting medial spot. I have now repeated the underside without colour, and I trust that the arrangement of the spots will be distinctly seen This is one of the commonest species : it differs much in size, but may be known, on the upperside, by the *very narrow border* of the wings *of the male* and the *very broad border of those of the female*; on the underside by the transverse band of the male, which has *the middle spot projecting outwardly beyond the rest,* and by the same band of the female, which has *the middle and last spot also projecting outwards.*" (*Hewitson*, l. c. in Ill. Diurn. Lep.)

" Quite distinct from *A. amphimuta*, Felder." (*Butler*, l. c.)

In speaking of *A. aroa*, Mr. Hewitson notes " *A. hypomuta* seems, on the underside of the hindwing, as if covered throughout with spots, the spaces between the bands and spots having nearly the same appearance as the usual spots and bands themselves have." (Ill. Diurn. Lep. p. 13, n. 60.)

Much confusion appears to have arisen with regard to this species. Mr. Hewitson, in 1862, placed the *A. amphimuta* of Felder, described two years previously, as a synonym of his species. At that time he had not seen Felder's figure of *amphimuta* published in 1865 in the Reise Novara, or else he would not, I should think, have considered the two species to be one and the same. Messrs. Butler and Druce consider them to be distinct, as I do, judging from the figures and descriptions alone. Mr. Distant, however, following Hewitson, puts both species together, rightly giving precedence to Felder's name. But to add confusion to confusion, he describes and figures as *amphimuta* a species with tails, while both Felder's and Hewitson's figures show tailless species. I think therefore that Distant's species is distinct from either of these, and I have named it *Arhopala rafflesii.*

I have not seen *A. hypomuta.* On the upperside the male may be known from *A. metamuta,* Hewitson, by its ultramarine-blue colour on both wings, by its narrow thread-like marginal border, and probably also by the disposition of the spots of the discal band of the forewing on the underside.

I give below as a foot note* a description of *A. amphimuta*, Felder, from Malacca and Borneo. It is considerably larger than *A. hypomuta*, as figured by Hewitson, and the disposition of the spots appears to be different; the male of *A. amphimuta* is described as being dull violet-blue on the upperside, and of *A. hypomuta* ultramarine-blue.

I also append a description† of *A. antimuta*, Felder, hitherto known only from Malacca and Singapore. The male is dull violet-blue on the upperside as in *A. amphimuta*, Felder, and

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* *Arhopala amphimuta*, Felder. *Amblypodia amphimuta*, Felder, Wien. Ent. Monatsch., vol. iv, p. 396, n. 6 (1860); id., Druce, Proc. Zool. Soc. Lond., 1873, p. 354, n. 10; id., Butler, Trans. Linn. Soc. Lond., Zoology, second series, vol. i, p. 548, n. 6 (1877); *Arhopala amphimuta*, Felder, Reise Nov., Lep., vol. ii, p. 232, n. 259, pl. xxix, fig. 8 (1865). HABITAT: "Malacca interior (*Felder*), Malacca (*Butler*), Borneo (*Druce*). EXPANSE: 1·9 inches. DESCRIPTION: "MALE. UPPERSIDE, *both wings* dull violet-blue, with a very narrow exterior margin, the costa of the forewing, and a narrow border to the hindwing. fuscous. UNDERSIDE, *both wings* pale fuscous. *Forewing* with the interior margin much paler, with the following spots and fasciæ of a little deeper tint than the ground-colour and margined with a much lighter tint:—two annular spots in the cell, a third internal spot very small, a disco-cellular spot, another median spot, an exterior fascia chain-like, formed of five spots, much broken at the third median nervule, another fascia submarginal and obsolete. *Hindwing* with six annular spots of a deeper tint than the ground-colour, and margined with a much lighter tint, of these four are basal (the lowest of them towards the interior margin), the fifth is subcostal, and the sixth within the cell; also with the following markings of a little deeper tint than the ground-colour and margined with a much lighter tint:—a median spot of a somewhat cordate form, a small disco-cellular fascia, a fascia beyond the middle chain-like, slightly broken twice and turned upwards posteriorly, (its two highest spots annular and well-separated), a submarginal series of lunules decreasing in size, also two larger black spots, densely irrorated in the middle with metallic-blue, and joined to these a black anal spot bordered inwardly with metallic blue, also a marginal line of a much lighter tint than the ground-colour. FEMALE. UPPERSIDE, *both wings* of a lighter tint. *Forewing* with a fuscous costal margin passing into a very broad, wavy fuscous exterior border. *Hindwing* with the costal border, the inferior nervules and margin excised in a radiated manner, the interior margin being of a paler tint than these. UNDERSIDE, *both wings* more plainly marked than in the male. *Hindwing* with the first subanal spot obliterated."

"Very like *A. epimuta*, Boisduval, Hewitson, in the design of the underside, also near *A. agelastus*, Hewitson, in the colour of the upperside and in the form of the wings, differing from *A. hypomuta*, Hewitson, (with which Hewitson united it) by the far paler annular spots of the underside, and the broken fasciæ of the forewing on the underside. (*Felder*, l. c. in Reise Novara.)

Mr. Butler says that *A. amphimuta*, Felder, is quite distinct from *A. hypomuta*, Hewitson. Mr. Distant notes "Mr. Hewitson recognised the identity of his *A. hypomuta* with the *A. amphimuta*, Felder, and though Mr. Butler states that the two are quite distinct, and places them wide apart, I have failed to find these differences." As I have stated above, I believe Messrs. Hewitson and Distant to be both wrong in considering these two species to be one and the same species, and I consider them to be quite distinct. I have seen no specimen of *A. amphimuta*, and have based this conclusion on a study of the descriptions and figures only.

† *Arhopala antimuta*, Felder, Reise Novara, Lep., vol. ii, p. 233, n. 260 (1865); *Amblypodia antimuta*, Butler, Trans. Linn. Soc. Lond., Zoology, second series, vol i, p. 548, n. 8 (1877); *Narathura antimuta*, Distant, Rhop. Malay, p. 266, n. 8, pl. xxiii, fig. 11, *female* (1885). HABITAT: Malacca interior (*Felder*), Malacca (*Butler*), Singapore. EXPANSE: *Male* and *female*, 1·85 to 1·95 inches. DESCRIPTION: "MALE. UPPERSIDE, *both wings* dull violet-blue, with a very narrow brown exterior border. UNDERSIDE, *both wings* pale fuscous. *Forewing* paler interiorly, with the following spots:—two annular within the cell, a third below the median nervure, also a small disco-cellular fascia, also an exterior fascia, shortened, chain-like and broken, also a submarginal fascia, macular. all these spots and fasciæ a little more deeply tinted than the ground-colour, and margined with a much lighter tint. *Hindwing* with six annular spots, one on the small costal lobe, three basal, a fourth internal, a fifth subcostal. a sixth larger one in the cell, besides these a seventh below the sixth rather heart-shaped, a disco-cellular small fascia, an external fascia of subtriangular spots well-distant from the margin, all these spots and fasciæ of a deeper tint than the ground-colour, and margined with a much lighter tint, yet another fascia beyond the middle, chain-like. strongly broken at the first median nervule, and joined to the small disco-cellular fascia by a streak, and bent upwards posteriorly, this last fascia of a tint only a little deeper than the ground-colour (the two anterior spots of this fascia well separated and annular); there are two anal spots black, bordered inwardly with metallic blue, and also two spots below these, obsolete, black, margined within with whitish atoms."

"Smaller than the preceding [*A. amphimuta*, Felder], constantly differs from it in the design of the anal region of the hindwing on the underside." (*Felder*, l. c.)

A female of this species is figured by Mr. Distant from a Malaccan specimen deposited in the British Museum. It presents a most unusual, if not unnatural, appearance, as the forewing on the upperside is shown with a dark spot closing the cell and a regular series of three subapical dark spots placed outwardly obliquely and divided by the discoidal nervules; no species that I have ever seen has markings at all approaching these.

Mr. W. Davison has sent me several specimens of what appear to be this species, all taken in Singapore. In the male on the upperside the black border is reduced to a mere thread, the coloration is rather dull and pale violet-blue, the abdominal margin of the hindwing whitish. In the female the outer black border to the forewing on the upperside is very broad at the apex, decreasing to the anal angle, and in one specimen there is a small black spot at the upper outer end of the discoidal cell. The hindwing has the outer margin somewhat widely black, the black extending up the veins. On the underside of both sexes the markings are obscure, but very slightly darker than the ground-colour. They are all well-formed: in Mr. Distant's figure they are shown as much misshapen. The male is easily distinguishable, as on the upperside of the forewing there is a large round patch of scales (fully $\frac{3}{10}$ of an inch in diameter), which, though apparently of the same shade of colour as those on the rest of the wing, are differently arranged; and are to be distinguished in certain lights only. Mr. Hewitson describes a similar patch as being present in the male of his *A. atosia*.

A. antimuta is near to *A. agelastus*, Hewitson, but the male of the former does not always exhibit the patch of scales above described, and is smaller, with the blue colour of a lighter, brighter, and more shining tint. The females of the two species are very much alike, but the four specimens of that sex of *A. antimuta* in my possession, differ from my single one of *A. agelastus* on the underside in the ground-colour being darker, more brown, while in the latter the ground-colour is inclined to rufous, and in the discal band of the forewing having the spot in the lower discoidal interspace always out of line and nearer the margin than the rest, instead of being even and regularly curved as in *A. agelastus*.

also has a very narrow outer black margin. The former may perhaps be known from the latter by the more profuse markings of the underside in both wings. The male, as in that sex of *A. atosia*, Hewitson, has a large round patch of differently-tinted scales on the upperside of the forewing on the disc seen only in certain lights.

Lastly will be found below* a description of *A. kurzi*, Distant, also from Malacca. The male is dark violaceous-blue on the upperside, the markings of the underside darker brown than the ground-colour, outlined with greyish, the discal band very short, ending posteriorly at the second median nervule, where it is strongly bent inwards. In *A. antimuta*, Felder, this band is continued in a gentle curve to the submedian nervure, as shown in Mr. Distant's figure of the species.

842. Arhopala perissa, Doherty.

A. perissa, Doherty, Journ. A. S. B., vol. lviii, pl. 2, p. (1889).

HABITAT: Myitta, Tenasserim valley, Burma.

EXPANSE: ♂, 1·8 inches.

DESCRIPTION: "MALE. UPPERSIDE, *both wings* rich uniform purple-blue over fully half the forewing and two-thirds of the hindwing. *Forewing* with the costal border and lower angle narrowly, and the apex widely black. *Hindwing* with the costa widely and the outer margin narrowly black, the blue extending beyond the submedian nervure. UNDERSIDE, *both wings* dull fuscous-brown, the markings but slightly darker, bordered by lines a little paler; only the basal spots on the hindwing annular, the others with straight borders. *Forewing* with three spots in the cell, and a broad uniform band, unbroken and but slightly curved, from the third subcostal to the first median nervule, the base of the first median interspace and the upper and basal part of the interno-median interspace dark, separated distinctly from an outer pale area in the interspace; a submarginal line of obscure darker spots bordered by a slightly paler line. *Hindwing* with the basal spots small and well-separated, a streak across the end of the cell extending to the submedian nervure, and a transverse discal band, dislocated outwardly below the second subcostal nervule, continuous in the next four interspaces; submarginal markings as on the forewing; a metallic green fascia from the first median nervule to the submedian nervure, and a touch of it on the spot in the first median interspace. The hindwing is distinctly undulate outwardly; it has no tail and but slight traces of a lobe."

"I know no species closely resembling it. It is a richly coloured butterfly above, but the underside is unusually dull-coloured." (*Doherty*, l. c.)

A very distinct species, which may be known from all the others of this group by the broad black margin to the forewing on the upperside, and the broad dark band below the discoidal cell on the underside exactly as in *A. tounguva*, Grose Smith. The type specimen is unique.

843. Arhopala agelastus, Hewitson.

Amblypodia agelastus, Hewitson, Cat. *Lycænidæ* B. M., p. 12, n. 56, pl. vi, figs. 61, 62, *female* (1862); *Narathura agelastus*, Moore, Journ Linn. Soc. Lond., Zoology, vol. xxi, p. 44 (1886).

HABITAT: India (*Hewitson*), Mergui (*Moore*), Burma.

EXPANSE: ♂, 1·5 to 1·6; ♀, 1·7 to 1·8 inches.

DESCRIPTION: "FEMALE. UPPERSIDE, *both wings* brilliant dark blue, the margins broadly brown. UNDERSIDE, *both wings* rufous-brown. *Forewing* with the transverse band of

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* *Arhopala kurzi*, Distant. *Narathura kurzi*, Distant, Rhop. Malay., p. 268, n. 12, pl. xxi, fig. 1, *male* (1885). HABITAT: Malacca. EXPANSE: *Male*, 1·7 inches. DESCRIPTION: "MALE. UPPERSIDE, *both wings* dark violaceous-blue, [with a black marginal thread]. UNDERSIDE, *both wings* brownish, with the following spots and fasciæ margined with greyish:—*Forewing* with two spots in and one at the end of the cell; two beneath the cell divided by the first median nervule; a macular fascia beyond the cell [composed of four spots], which is strongly dislocated at the third median nervule, and is then inwardly continued by an almost separated spot terminating near the second median nervule *Hindwing* with about six basal spots [the extreme basal spots have been omitted in Mr. Distant's figure], medial discal fascia commencing at the second subcostal nervule, followed by a fascia crossing the whole breadth of the wing, a submarginal fascia, and marginal metallic greenish spots, more or less marked with blackish near the anal angle. *Body* above and beneath, with *legs*, more or less concolorous with the wings."

"Only one male specimen of this distinctly marked species is known to the describer, and the female has still to be discovered." (*Distant*, l. c.)

equal breadth, slightly curved outwards. *Hindwing* with the band separated from its basal spot on the costal margin, the anal angle with three spots of silvery-blue." (*Hewitson*, l. c.) MALE. UPPERSIDE, *both wings* of a slightly darker shade of brilliant blue than in the female, the black margins reduced to a mere thread. UNDERSIDE, *both wings* with the markings more obscure than in the female.

I have seen three specimens of this lovely species, two males taken by Lieutenant E. Y. Watson at Beeling, Burma, on 30th April, 1886, and a female by Dr. J. Anderson, at Yimiki, King Island, Mergui Archipelago, on 25th February, 1882. The bands and spots of the underside are hardly darker than the ground-colour, outwardly defined with greyish.

Since the above was written, I have seen six males and four females of this species taken by Mr. W. Doherty during the cold weather at Mergui and at Myitta in the Tenasserim valley. The markings of the underside are a little variable, the spot of the discal band in the lower discoidal interspace of the forewing on the underside being sometimes quite out of line, and some specimens shewing traces of a circular patch of differently-shaded scales on the upperside of the forewing, as in *A. atosia*, Hewitson, and *A. antimuta*, Felder. *A. agelastus* is very closely allied to *A. antimuta*.

844. **Arhopala chinensis**, Felder.

A. chinensis, Felder, Reise Novara, Lep., vol ii, p. 231, n. 257, pl xxix, fig. 10, *male* (1865); *Amblypodia chinensis*, Moore, Proc. Zool. Soc. Lond, 1865, p. 774; id., Hewitson, Ill. Diurn. Lep., p. 14*g*, n. 96 (1869); *Satadra chinensis*, id., Journ. A. S. B., vol liii, pt. 2, p. 41 (1884).

HABITAT: Shanghai, South China (*Felder*); Darjiling, China (*Moore*); North India (*Hewitson*).

EXPANSE: ♂, 2·0 inches.

DESCRIPTION: "MALE. UPPERSIDE, *both wings* brilliantly deep blue. *Forewing* with the costal and exterior margins very narrowly blackish-fuscous. *Hindwing* with the costal and exterior margins narrow but increasing in width, blackish-fuscous, the interior margin dull fuscous. UNDERSIDE, *both wings* reddish-brown, brilliantly shining, with a common, whitish, marginal line, obsolete on the forewing. *Forewing* with the inner third of the surface whitish, and the following markings:—in the cell two large spots of a deeper tint than the ground-colour, and on the sides bordered with whitish, a third spot close to them, internal, and shaped as a short streak, and also a spot below it, both of the ground-colour, a small but rather broad disco-cellular fascia, and also a curved exterior fascia slightly broken posteriorly and joined at the first median nervule, these two last fasciæ of a deeper tint than the ground-colour and margined laterally with whitish, the intervals between the several spots and fasciæ of a much lighter tint than the ground-colour. *Hindwing* with the following deep brown markings bordered with violet-white:—four annular spots, one on the costal lobe, three at the base, the latter blending towards the costa with a short, broad fascia; a bent discal fascia, another narrower exterior fascia rather close to it, broken at the first median nervule and anteriorly losing itself in the ground-colour, and finally an exterior shade touching the last fascia, the intervals between these spots and fasciæ irrorated with a violaceous-whitish colour, also four spots on the exterior margin formed of black specks, more or less covered with metallic-green irrorations, and inwardly margined with a violet-whitish tint, the inner margin whitish-brown."

"This fine distinct insect shows only a specific relationship with *A. apidanus*, Cramer, yet it differs also very strikingly from that species in its much longer wings, in the outer margin of the forewing being waved below the apex, and the entire absence of tails to the hindwing." (*Felder*, l. c. in the Reise Novara.)

In spite of Mr. Moore having in 1865 recorded this species from Sikkim, and Mr. Hewitson in 1869 from North India, I very much doubt its occurrence within our limits. It is by no means improbable that those writers mistook *A. chinensis* for a somewhat similar Sikkim species which I have since described as *Nilasera asoka*, but the latter is tailed, while the former

is tailless. There is a great general similarity in appearance between these two species, but there are many differences in detail. I have not seen a specimen of *A. chinensis*. Mr. Hewitson says that *A. chinensis* is " very near to *A. areste.* " I can see hardly any resemblance, except that both are tailless.

845. **Arhopala davisonii,** n. sp. (FRONTISPIECE, FIG. 135 ♂).

Narathura metamuta (part), Distant (*nec* Hewitson), Rhop. Malay., p. 267, n. 10, pl. xxiii, fig. 18, *male* (1885).

HABITAT : Mergui ; Myitta, Tenasserim Valley ; Malacca ; Singapore ; Borneo.

EXPANSE : ♂, ♀, 1·4 to 1·6 inches.

DESCRIPTION : MALE. UPPERSIDE, *both wings* rich but dull dark ultramarine-blue, with an extremely narrow outer black border, which in the hindwing is rather broader towards the anal angle. *Hindwing* with the costal margin rather broadly black, the abdominal margin pale. UNDERSIDE, *both wings* dull brown, all the markings small, obscure, but well-formed, of a slightly darker shade of brown than the ground and margined with grey. *Forewing* with a spot near the base of the cell, a spot at the middle of the cell, and one closing the cell ; the discal band regular, even, consisting of six spots forming an angled band, the upper four straight, outwardly oblique, the two lower spots parallel to the margin ; a pair of spots below the median nervure divided by the first median nervule ; the inner margin broadly pale ; the usual obscure marginal fasciæ. *Hindwing* with a basal series of four small spots arranged across the wing, a subbasal series of four larger spots, an elongated spot closing the cell, the usual discal irregular band and marginal obscure fasciæ ; an elongated patch of verdigris-green metallic scales at the anal angle. FEMALE. UPPERSIDE, *forewing* with the costa narrowly, the apex very widely, the outer margin widely black, the rest, equal to rather more than half the surface of the wing, shining rather deep bluish-purple. *Hindwing* with the costa and outer margin rather broadly black, the basal two-thirds of the wing bluish-purple ; the abdominal margin broadly pale fuscous. UNDERSIDE, *both wings* as in the male.

I have but little doubt that this species is the one figured by Mr. Distant doubtfully as a variety of *A. metamuta* on the identification of the British Museum. I have much pleasure in naming it after Mr. W. Davison, Curator of the Raffles Museum, Singapore, who has furnished me with seven male and six female specimens, which shew no variation, and were all taken at Singapore. It is probably nearest to *A. hypomuta*, Hewitson, differing from the Hewitson's figures of that species in the colour of the upperside of the male being much darker and deeper blue, and in the spots of the underside being perhaps somewhat differently arranged, and but slightly darker than the ground, instead of very much darker, as in *A. hypomuta*. Judged from Hewitson's figures, *A. hypomuta* also is a considerably broader insect than *A. davisonii*. Mr. Doherty says that it " is one of the commonest and most ubiquitous of Malayan insects, and is abundant in Borneo."

The figure shews both sides of the type specimen from Singapore in the collection of the Raffles Museum, Singapore.

Genus 131.—ACESINA, Moore. (PLATE XXV).

Acesina, Moore, Journ. A. S. B., vol. liii, pt. 2, p. 41 (1884).

" FOREWING, with the *costa* less arched than in *Panchala*, Moore, *apex* less pointed, *exterior margin* more oblique and waved, *fourth subcostal nervule* emitted further from the end of the third. HINDWING, not so broad or quadrate in shape, the *costa* but slightly arched from the base, *exterior margin* more oblique and regularly convex, with a slender *tail* one-fourth of an inch long from the end of the first median nervule, *abdominal margin* shorter. *Antennal club* somewhat shorter. *Eyes* naked. Type, *A. paraganesa*, de Nicéville." (*Moore*, l. c.)

In the forewing the costal nervure terminates on the margin before the apex of the discoidal cell ; the second subcostal nervule has its origin just midway between the bases of the first subcostal and upper discoidal ; the third subcostal is short, and has its origin nearer to the apex of the wing than of the cell ; the upper discoidal nervule is somewhat bent downwards just after its origin ; middle disco-cellular nervule short, one-third of the length of the lower,

straight, outwardly oblique; lower disco-cellular also straight, but inwardly oblique; second median nervule originating some little distance before the lower end of the cell. In the hindwing the costa is shaped very much as in *Arhopala ganesa,* Moore, but is not quite so emarginate just before the apex, and the apex itself is a little less produced; the first subcostal nervule is given off long before the apex of the cell; the upper disco-cellular nervule is a little shorter than the lower, straight, outwardly oblique; the lower disco-cellular is also straight, but is inwardly oblique; the second median nervule originates a short distance before the lower end of the cell. No secondary sexual characters in the male.

This genus has been so recently established that I am unable to say with exactness either the number or the distribution of its species. In India it contains but two species, one of which occurs from Nepal to Assam, the other in Upper Tenasserim. The sexes of *A. paraganesa* mihi, are nearly alike, having small patches of blue on the upperside of both wings confined to the disc and base. In *A. aberrans,* mihi, the sexes are very different on the upperside; the male being, except for a very narrow outer black border, entirely purple-blue, and the female marked like the other species. I have taken *A. paraganesa* in Sikkim; it inhabits forests, and settles only on the leaves of trees and bushes, and has rather a weak flight. The markings of the underside are closely similar in both species to those obtaining in the genus *Arhopala,* Boisduval, from which *Acesina* is structurally hardly separable.

Key to the species of Acesina.

A. Both sexes, upperside, both wings with the costa and outer margin broadly black.
 846. A. PARAGANESA, Nepal, Sikkim, Assam.

B. Male, upperside, both wings with the outer margins only very narrowly black.
 847. A. ABERRANS, Burma.

846. Acesina paraganesa, de N.

Amblypodia paraganesa, de Nicéville, Journ. A. S. B., vol. li, pt. 2, p. 63, n. 185 (1882); *Panchala paraganesa,* Moore, Proc. Zool. Soc. Lond., 1883, p. 530; *Acesina paraganesa,* Moore, Journ. A. S. B., vol. liii, pt. 2, p. 42 (1884); *Amblypodia ganesa,* Hewitson (*nec* Moore), Cat. *Lycænidæ* B. M., p. 13, n. 60, pl. vii, fig. 72, *male* (1862).

HABITAT: Northern India (*Hewitson*), Nepal (*Moore*), Sikkim, Assam.

EXPANSE: ♂, ♀, 1·2 to 1·4 inches.

DESCRIPTION: "Nearest to *Panchala* [=*Arhopala*] *ganesa,* Moore. UPPERSIDE, *both wings* violet-brown, with the discal areas of a purplish-violaceous blue. *Forewing* with the blue colour confined to a narrow oval area, including the cell. *Hindwing* with a long slender tail from the end of the first median nervule; the blue colour confined to the medial area; a marginal row of indistinct whitish double lunules. UNDERSIDE, *both wings* with similarly disposed markings to those in *P. ganesa,* those on the *forewing* being dark chocolate-brown, and the interspaces between the cell-marks also of the same colour. *Hindwing* with chocolate-brown markings and basal interspaces, the markings also mostly with pale centres." (*Moore,* l. c. in Proc. Zool. Soc. Lond., 1883.)

The above description evidently applies to the female; the male differs in having the blue coloration on the upperside of both wings more extensive, and marked on the forewing with whitish between the veins beyond the end of the cell; hindwing blue, the costal and outer margins black, extending decreasingly up the veins from the outer margin. *Cilia* in both sexes brown at the apex of the forewing becoming white towards the anal angle, white on the hindwing becoming brown towards the anal angle. *Tail* brown, tipped with white.

Rare in Sikkim, where it occurs in April, May, and October. I have seen one specimen from Sylhet obtained by the Revd. Walter A. Hamilton.

847. Acesina aberrans, de N. (PLATE XXV, FIGS. 142 ♂, 143 ♀).

A. aberrans, de Nicéville, Journ. A. S. B., vol. lvii, pt. 2, p. 279, n. 8, pl. xiv, figs. 3, *male*; 4, *female* (1888).

HABITAT: Upper Tenasserim.

EXPANSE: ♂, 1·45; ♀, 1·50 inches.

DESCRIPTION: "MALE. UPPERSIDE, *both wings* shining bluish-purple, with a very narrow outer black margin. *Hindwing* with some marginal narrow black streaks on either side of the tail divided from the cilia by a white thread; *tail* black tipped with white. UNDERSIDE, *both wings* coloured and marked almost exactly like *A. paraganesa*, mihi. *Forewing* with the discal macular band much broken in the middle, the lower portion below the third median nervule being shifted backwards considerably, so that the outer anterior angle of the uppermost spot of the lower portion of the band touches the inner posterior angle of the spot above it; in *A. paraganesa* this band is straight and unbroken. *Hindwing* with a few metallic green scales towards the anal angle which are not present in *A. paraganesa*. FEMALE. UPPERSIDE, *forewing* with the costa, apex, and outer margin all broadly black, the base and disc of the wing to the inner margin pale blue; a whitish spot at the end of the discoidal cell, one beyond in the lower discoidal interspace, and two smaller ones below divided by the second median nervule. *Hindwing* with the costa broadly, the outer margin less broadly and decreasingly black, the veins black, widening out towards the margin, the rest of the wing pale blue; a fine anteciliary white line on either side of the tail. UNDERSIDE, *both wings* marked as in the male, but the metallic green scales on the *hindwing* wanting."

"A larger species than *A. paraganesa*, the male conspicuously different, as the blue coloration extends over the entire surface except the extreme margin, while in *A. paraganesa* it is confined to a patch on the disc and base; the opposite sexes in *A. paraganesa* are also nearly alike, while in *A. aberrans* they are widely different. This is only the second known species in the genus; the male was taken by Major C. T. Bingham in the Meplay Valley on the 6th January, 1882, the female was obtained also by him at Donat in January." (*de Nicéville*, l. c.)

The figures shew both sides of both sexes of the type specimens from Burma in my collection.

Genus 132.—MAHATHALA, Moore. (PLATE XXVII).

Mahathala, Moore, Proc. Zool. Soc. Lond., 1878, p. 702.

"WINGS, broad. FOREWING, somewhat short, *exterior margin* nearly erect and slightly scalloped, *third subcostal nervule* bifurcate. HINDWING, short, *costa* abbreviated, lobed at the base, concave towards the end, the *apex* produced and pointed upwards, *exterior margin* slightly concave below the apex, and very convex in the middle; *anal angle* lobed; a spatulate *tail* extending from the end of the first median nervule. *Palpi* long, stout, apical joint broad laterally. *Antennæ* thickened to apex." *Eyes* naked.

"Differs from typical *Amblypodia* (*A. narada*, Horsfield) in the entirely different form of the wings; the forewing having the third branch of the subcostal nervure bifurcate instead of trifurcate, as in the male of *A. narada*." (*Moore*, l. c.)

In the forewing the costal nervure is rather less than half the length of the costa, and does not reach the level of the apex of the discoidal cell; the first and second subcostal and upper discoidal nervules are equi-distant at their bases, the third subcostal is rather long and arises about midway between the apices of the cell and of the wing; the middle disco-cellular nervule is very short, straight, outwardly oblique, lower disco-cellular is about four times as long as the middle disco-cellular, concave, slightly inwardly oblique; second median nervule given off some little distance before the lower end of the cell, first median nervule bowed downwards near its base. In the hindwing the costal nervure is strongly sinuate, bent upwards at its end; the first subcostal nervure is given off some little distance before the apex of the cell; the upper disco-cellular nervule is straight, slightly outwardly oblique, the lower disco-cellular is very slightly concave and very slightly inwardly oblique; the second median nervule given off just before the lower end of the cell; the submedian nervure is straight; the internal nervure short, highly sinuous; the abdominal margin

rather deeply excised, leaving a distinct anal lobe beyond. The antennæ are very short, just one-third the length of the costa of the forewing, and practically without a club.

M. ameria, Hewitson, the type of this genus, is quite unique amongst this group of butterflies (the old genus *Amblypodia* of authors) in having the tail distinctly spatulate; it is perhaps even more remarkable on account of the great prolongation of the outer margin of the hindwing, which causes the apex to be extremely acute, the costa being deeply cut out just before the apex. As far as I am aware, this character occurs in no other species of the group except *ganesa*, Moore, the type of the genus *Panchala* of Moore, but in that species this feature is very greatly reduced, and to a still greater extent in the genus *Acesina*, Moore; also *P.* [*Arhopala*] *ganesa* possesses no tail whatever, while the tail in *Acesina* is long and filiform.

M. ameria has a very wide range, occurring in Bengal, Assam, the Chittagong Hill Tracts, Mergui, the Malay peninsula, Siam, and Hainan Island off the coast of China, but appears to be nowhere common.

848. **Mahathala ameria,** Hewitson. (PLATE XXVII, FIG. 200 ♀).

Amblypodia ameria, Hewitson, Cat. *Lycænidæ* B. M., p. 14, n. 64, pl. viii, figs. 85, 86, *female* (1862); *Mahathala ameria*, Moore. Proc. Zool. Soc. Lond., 1878, p. 703; id., Rothney, Ent. Month. Mag., vol. xix, p. 35 (1882); *Narathura ameria*, Distant, Rhop. Malay., p. 268, n. 13, pl. xxi, fig. 30, *female* (1885).

HABITAT: Northern India, Siam (*Hewitson*), Hainan, China (*Moore*), Barrackpore (*Rothney*), Mergui (*Doherty*), Perak (*Distant*), Beerbhoom District, Calcutta, Goalpara, Sibsagar, Chittagong Hill Tracts.

EXPANSE: ♂, ♀, 1·5 to 1·8 inches.

DESCRIPTION: FEMALE. "UPPERSIDE, *both wings* brown. *Forewing* dark brown, with a large spot of lilac-blue from the base to the middle. *Hindwing* rufous-brown, with a small narrow spot of blue near the base. *Tail* broader than usual. UNDERSIDE, *forewing* rufous-brown, the apex grey, three small white spots within the cell, two spots at the end of the cell margined with white, the transverse band broad, of nearly equal width, curved near the apex. *Hindwing* rufous- or grey-brown, *the costal margin near the apex protruded outwards to an acute point*, the base and an ill-defined medial band rufous-brown." (*Hewitson*, l. c.) "FEMALE. UPPERSIDE, *both wings* dark violaceous-blue, costal and outer margins broadly dark fuscous. *Hindwing* with the abdominal margin broadly dark fuscous. UNDERSIDE, *forewing* somewhat rufous-brown, discoidal cell containing a whitish line near the base, two near the middle, and two at the termination, some obscure whitish linear marks above the cell; beneath the cell the colour is paler, containing a conical brownish spot between the second and first median nervules and a broad brown spot between the first median nervule and the submedian nervure; a curved transverse fascia bordered with greyish between the end of the cell and the outer margin, dislocated at the upper discoidal and median nervules, and with a submarginal row of lunulate spots bordered with greyish. *Hindwing* brownish with a steely tinge, the basal third with reticulated dark brown fasciæ, followed by a transverse, discal, angulated fascia of the same colour, and with a submarginal series of dark brown spots. *Body* above and beneath with *legs* more or less concolorous with the wings." (*Distant*, l. c.) MALE. UPPERSIDE, *both wings* of a rich deep blue, not purple as in the female, the outer margins narrowly black. UNDERSIDE, *both wings* as in the female.

M. ameria is very variable in the extent of the purple coloration of the female on the upperside. Calcutta specimens have about one-third less purple than those from the Malay peninsula, the purple not nearly reaching the costa of the forewing. The female appears to be far more often met with than the male, of which sex I have seen two specimens only. *M. ameria* is a rare species, with a wide range, occurring in the plains of Bengal (Beerbhoom, Barrackpore and Calcutta), in Assam (Goalpara and Sibsagar), in the Chittagong Hill Tracts, Mergui, Perak, and Hainan.

The figure shews both sides of a female specimen from Calcutta in the collection of the Indian Museum, Calcutta.

Genus 133.—CURETIS, Hübner. (Plate XXVII).

Curetis, Hübner, Verz. bek. Schmett., p. 102 (1816); id., Moore, Lep. Cey., vol. i, p. 73 (1881); id., Distant, Rhop. Malay., p. 201 (1884); *Phædra*, Horsfield, Cat. Lep. E. I. Co., p. 123 (1829); *Anops*, Boisduval, Sp. Gén., vol. i, pl. xxiii, fig. 1 (1836); id., Westwood, Gen. Diurn. Lep., vol. ii, p. 473 (1852).

" Forewing, subtriangular, *costal margin* strongly arched at base, and then almost obliquely straight to *apex*, which is either subacute or prominently and falcately acute, *outer margin* concavely sinuate where the apex is produced, *inner* margin concavely sinuate in the male, obscurely so in the female; *first subcostal nervule* emitted at about one-third before the end of the cell, *second* at one-fourth before the end of the cell, *third* and *fourth* bifurcating about midway between the end of the cell and the apex of the wing. Hindwing, rounded, the *anal angle* more acute in the male than in the female; [often strongly angled at the termination of the third median nervule, and at the anal angle]; *subcostal nervules* bifurcating near the end of the cell; [*second median* nervule given off just before the end of the discoidal cell]. *Eyes* hairy; *palpi* porrect, clothed with fine adpressed scales, apical joint slender, longer in the female than in the male; *antennæ* short, gradually thickened into a long apical club; *legs* short, thick, and densely clothed with scales, anterior tarsus of the male consisting of a single joint, with an obtuse apical claw and with some fine spines beneath; anterior tarsus of the female five-jointed, with two small apical claws." (*Distant*, l. c.)

Larva cylindrical, rapidly increasing in size from the second to the fifth segment, then rapidly decreasing to the eighth, the remaining segments equal-sized; green marked with paler and darker shades of the same colour, and with a conspicuous opaque dead white oblique mark on each side of the ninth segment; the twelfth segment furnished with two diverging cylindrical fleshy rigid tentacula, from which the animal can evert an equally long process furnished at its extremity with a tuft of hairs. Pupa hemispherical, green, covered with tiny depressions, with a conspicuous heart-shaped pale ochreous mark on the thorax in the dorsal line.

"The geographical range of *Curetis* includes continental India, Ceylon, the Andaman and Nicobar Islands, Burma, the Malay Peninsula, and probably the whole length and breadth of the Malay Archipelago." It occurs also in China and Japan (*C. acuta*, Moore).

"This genus exhibits features of structural variability which await the explanation of the local biological observer. In outline, the apical angle of the forewing, and the anal angle of the hindwing, are either acutely produced or obtusely subacute. There are also three forms of sexual dissimilarity; firstly, in which the female has the pale markings whitish, as in *C. æsopus*, Fabricius; secondly, in which the female pale markings are of an ochraceous character, as in *C. felderi*, Distant, both of these forms having the male entirely dissimilar; and thirdly, in which the male approaches the peculiar markings of the female, as in *C. sperthis*, Felder." (*Distant*, l. c.) With reference to this latter question, I believe the females of certain species of *Curetis* to be dimorphic, as both the white and ochreous-coloured females occur with males of *C. thetis*, Drury, in Calcutta and Barrackpore, while Mr. G. F. Hampson has remarked the same thing as regards the females of *C. thetis* in the Nilgiris; the ochreous-coloured form being much rarer than the white. *C. saronis*, Moore, which occurs in Cachar, and the Andaman and Nicobar islands, appears to possess an ochreous female only, while with regard to several other species our knowledge is not sufficient to say if they have one or more forms of female. *Curetis* has one feature not found in any other genus with three subcostal nervules to the forewing, *viz.*—the terminal portion of the costal nervure reaches the outer margin *below* the apex of the wing in both sexes, in all the other genera it reaches the costa at or just before the apex; the third subcostal nervule being very long and terminating at the apex in this genus.

The species of the genus *Curetis* are amongst the most beautiful and the largest of the *Lycænidæ*. The males of all the species are of a rich glossy coppery-red colour on the upperside, with a more or less broad margin of black, which in some species is so broad that the red is reduced to a moderate-sized patch in the middle of each wing, and in others is so narrow or even linear that both wings are red with a mere edging of black. The underside is pure silvery-white, with sometimes some very indistinct bands

and spots, some of which appear to be raised or embossed; in some examples these bands are prominent, and the whole surface is sprinkled with minute black dots. The females are more variable: they are black above, usually with a large white patch in the middle of each wing, and a conspicuous disco-cellular black mark in the forewing; the white portion of the wings is very variable in size. Sometimes the white portions are replaced by ochreous patches, which, in *C. saronis* from the Nicobor Isles, are sometimes very small, sometimes so large as to occupy half the area of the forewing. The underside of the female is like that of the male. The outline of the wings, as noted above by Mr. Distant, is also variable: in some species, the forewing is much acuminated at the apex, concave below the apex to the first median nervule, then inwardly oblique, the hindwing being strongly angulated between the third median and discoidal nervules and again at the anal angle. In other species, the apex of the forewing is simply acute, the outer margin straight, and the hindwing evenly rounded. The larva and pupa are even more remarkable and peculiar than the imagines. The former does not appear to possess a honey gland, and I have never seen ants attending it, but the organs on the twelfth segment are enormously produced. The pupa is quite unique in shape and markings. The short abdomen of the imago and the ample fold of the inner margin of the hindwing, which is channelled so as to receive and conceal the entire abdomen when the wings are folded, is a marked feature of *Curetis.*

"After a careful and repeated examination of a large series of specimens, and every wish to adopt the species proposed by other entomologists, I feel compelled most reluctantly to come to the conclusion that this genus, as we know it up to the present time, contains two species only—*A.* [=*C.*] *bulis*, Doubleday and Hewitson, which is easily known, and *A. thetis*, Drury, of which the difficulty is to find two examples that are alike, varying in the males in the breadth of the margin, in the females in the colour of the centre of the wings, and on the underside of both from a pure spotless white to the clouded, distinctly-banded variety from Borneo and Celebes. A variety of the female in the collection of Mr. Wallace is all brown above, with the exception of a moderate-sized white spot in the middle of the forewing, and a minute round spot of the same colour near the apex of the hindwing." (*Hewitson*, Ill. Diurn. Lep., p. 15). I have found precisely the same difficulty as Mr. Hewitson had done in splitting up the numerous forms of *Curetis* occurring in India into distinct and well-defined species. I have before me over four hundred and fifty specimens of both sexes of the genus. I am able to divide them into two distinct groups or species by the males: in the one, of which the type is *C. thetis*, Drury, the outer black border of the forewing on the upperside, though variable in width, never extends along the inner margin, except slightly so in one species, *C. æsopus*, Fabricius; in the other, of which the type is *C. bulis*, Doubleday and Hewitson, the black border invariably extends along the inner margin, and the extent of the black area is enormously variable. In *C. thetis* the outline of the wings in all the different forms and in both sexes is constant, in *C. bulis* on the contrary it is most inconstant: sometimes the apex of the forewing is acute only, as in *C. thetis*; in others it is highly acuminate; and the hindwing in some is as evenly rounded as in *C. thetis*, in others it is highly angulate in the middle of the outer margin and at the anal angle. The females of both groups appear to be dimorphic, some being white, others ochreous. As, however, the late Mr. Hewitson and myself alone appear to hold the view of the mutability of these species, I have in the following descriptions done my best to enable my readers to follow the distinctions given by various authors to the different species, and to make my large material fit in with these descriptions. I hold, however, to the opinion as above expressed that there are but two distinct species occurring in the region dealt with in this book. I have made no remarks regarding the females, as it appears to be quite impossible to match them correctly with the described species of males except by breeding them from the egg, as I find that in very many instances more than one distinct form of the male occurs in one locality, and I know of no character by which the females can be paired with them. In the habitat headings I have given only the localities recorded by other authors for the several species.

It should be noted that no form of the *thetis* group occurs in the Himalayas, and no form of the *bulis* group in South India and Ceylon, except in the hills of Orissa, the Central Provinces, and the Wynaad. It might perhaps be thought that by grouping the females together from these two geographical regions, some character would make itself manifest by which they, like the males, could be separated into two groups. This however is not the case, the shape of the wings and the extent of the white or ochreous coloration on the upperside yields no character, as does the width of the outer black border of the forewing on the upperside in the males, by which they can be segregated.

In the first group, which contains seven species occurring within our limits, the outer black border on the upperside of the forewing of the male does not extend (except slightly in *C. æsopus*) along the inner margin. In both sexes the apex of the forewing is simply acute, never acuminate, and the outer margin of both wings even, never angulate.

Key to the Indian species of Curetis.

First group.

A. Outer black border on upperside of forewing of male not at all or but slightly extending along the inner margin.
- *a.* Outer black border on upperside of hindwing of male very narrow, almost linear.
  - *a*¹. Inner edge of outer black border on upperside of forewing of male angled opposite the apex.
    - *a*². Outer black border on upperside of forewing of male very narrow throughout.
      - 849. C. PHÆDRUS, Plains of India, Ceylon, Nias, Java.
    - *b*². Outer black border on upperside of forewing of male rather wider on costa and at apex.
      - 850. C. THETIS, Plains of India, Ceylon, Java.
  - *b*¹. Inner edge of outer black border on upperside of forewing of male evenly rounded.
    - 851. C. ARCUATA, Malda, South India.
- Outer black border on upperside of hindwing of male broader, not linear.
  - *a*¹. Outer black border on upperside of forewing of male not at all extending along the inner margin.
    - *a*². Of large size, outer black borders on upperside of both wings of male very broad.
      - 852. C. GLORIOSA, Sylhet, Burma.
    - *b*². Of smaller size, outer black borders on upperside of both wings of male less broad.
      - 853. C. SARONIS, Cachar, Andamans and Nicobars.
      - 854. C. FELDERI, Burma, Malay Peninsula.
  - *b*¹. Outer black border on upperside of forewing of male extending slightly along the inner margin.
    - 855. C. ÆSOPUS, Burma, Malay Peninsula.

849. **Curetis phædrus**, Fabricius. (PLATE XXVII, FIG. 201 ♂).

Papilio phædrus, Fabricius, Sp. Ins., vol. ii, p. 125, n. 566 (1781); idem, id., Mant. Ins., vol. ii, p. 79, n. 720 (1787); *Hesperia phædrus*, id., Ent. Syst., vol. iii, pt. 1, p. 307, n. 165 (1793); *Candalides phædrus*, Hübner, Verz. bek. Schmett., p. 73, n. 720 (1816); idem, id., Zutrage Ex. Schmett., figs. 263, 264, *male* (1823); *Polyommatus phædrus*, Godart, Enc. Méth., vol. ix, p. 675, n. 181 (1823); *Anops phædrus*, Boisduval, Sp. Gén., vol. i, pl. xxiii, fig. 1, *male* (1836); id., Butler, Cat. Fab. Lep. B. M., p. 160, n. 2 (1869); id., Swinhoe, Proc. Zool. Soc. Lond., 1885, p. 135, n. 85; *Curetis phædrus*, Butler, Proc. Zool. Soc. Lond., 1881, p. 605, n. 13; id., Kheil, Rhop. Ins. Nias, p. 33, n. 119 (1884); *Papilio cinyra*, Cramer, Pap. Ex., vol. iii, p. 76, pl. ccxxxviii, fig. C, *male* (1779); *Anops cinyra*, Horsfield and Moore, Cat. Lep. Mus. E. I. C., vol. i, p. 53, n. 95 (1857); *Anops santana*, Moore, Horsfield and Moore, Cat. Lep. Mus. E. I. C., vol. i, p. 54, n. 97 (1857).

HABITAT: East Indies (*Fabricius*); Bengal, Coromandel (*Godart*); Ceylon, Nilgiris (*Butler*); Poona, November; Bombay, July, September, and October (*Swinhoe*);* Coromandel Coast (*Cramer*); Java (*Horsfield* and *Moore*); Nias Island (*Kheil*).

EXPANSE: ♂, 1·7 inches.

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* Since the above was written I have seen the specimens Colonel Swinhoe calls *C. phædrus*. They are not that species, but *C. thetis*. In his later writings he places the former name as a synonym of the latter.

DESCRIPTION: MALE. UPPERSIDE, *both wings* shining coppery-red. *Forewing* with the costal and outer margins very narrowly black. *Hindwing* with a very narrow black marginal line, that colour extending a short distance up the veins. UNDERSIDE, *both wings* pure silvery-white, with some indistinct macular bands and spots.

The above description is drawn up from a male specimen from Orissa which has been named *C. phædrus* by Mr. Moore. I possess another male from Orissa, one from Ganjam, two from Bangalore, and one from the Pulni Hills which more or less agree with this specimen. All these specimens have the black border on the upperside of both wings the narrowest of all. In the Lepidoptera of Ceylon Mr. Moore places *C. phædrus* as a synonym of *C. thetis*, but the specimen to which he has given the former name has the black margin narrower than is shewn in his figure of *C. thetis*. *C. phædrus* as here understood does not appear to be constant to any particular locality, as in three places out of the four from which I have received it the wider-bordered *C. thetis* also occurs. Mr. Aitken remarks that in Bombay "though nowhere plentiful, it may be met with in every part of the Presidency. It appears after, or perhaps before, the end of the monsoon, and remains till the end of the year. In the afternoon, when most other Butterflies have retired to rest, it loves to bask in the sun on a small tree or high bush, with wings just a little open." These remarks probably apply to the true *C. thetis*.

The figure shews both sides of the male specimen from Khurda, Orissa, in my collection which has been named *C. phædrus* by Mr. Moore.

850. **Curetis thetis**, Drury.

Papilio thetis, Drury, Ill. Ex. Ent., vol. ii, p. 16, pl. ix, figs. 3, 4, *female* (1773); id., Cramer, Pap. Ex., vol. iii, p. 77, pl. ccxxxviii, fig. D, *female* (1779); *Anops thetys*, Horsfield and Moore, Cat. Lep. Mus. E. I. C., vol. i, p. 52, n. 93, pl. xii, figs. 5, *larva*; 5*a*, *pupa* (1857); *Anops thetys*, Hewitson, Ill. Diurn. Lep., p. 15, n. 1 (1863); *Curetis thetys*, Moore, Lep. Cey., vol. 1, p. 74, pl. xxxiv, figs. 2, *male*; 2*a*, *female* (1881); id., de Nicéville, Journ. Bomb. Nat. Hist. Soc., vol. iii, p. 165, pl. xxvi, *larvæ*, *pupa*, and *tentaculum* (1888); id., Staudinger, Ex. Schmett., p. 279, pl. xcvi, *male* and *female* (1888); *Phædra terricola*, Horsfield, Cat. Lep. E. I. Co., p. 124, n. 51 (1829).

HABITAT: Bombay (*Drury*); Tranquebar (*Cramer*); Java (*Horsfield*); North India, Canara (*Horsfield* and *Moore*); Ceylon (*Moore*); Barrackpore (*Rothney* and *Moore*).

EXPANSE: ♂, ♀, 1·75 inches.

DESCRIPTION: "MALE. UPPERSIDE, *both wings* glossy cupreous-red. *Forewing* with a narrow black costal and exterior marginal band, the inner border of which is jagged on the veins and acute at the apex. *Hindwing* with a black costal border and very narrow marginal band, abdominal border cupreous-brown. *Body* cupreous-brown, thorax and *head* tinged with olive-brown. UNDERSIDE, *both wings* glossy-white, with a very faintly indicated dusky lunular transverse discal fascia, and a marginal row of more distinct black speckles. FEMALE. UPPERSIDE, *both wings* dark brown. *Forewing* with a broad white medial discal patch. *Hindwing* with a narrow white irregular curved upper discal band. *Cilia* white. UNDERSIDE, *both wings* as in the male. *Legs* with red band above. *Palpi* black above. *Antennæ* black, tipped with red." (*Moore*, l. c. in Lep. Cey.)

EGG china-white; an oblate sphere, flatter below than above, or turbinate, being shaped like many *Echini*, covered with a very coarse hexagonal reticulation, the apex of the egg having a deep central depression. LARVA on emergence eats a hole through the top of the egg about equalling one-third of its upper surface and crawls out. The empty shell has a close superficial resemblance to an echinus shell. The larva is pale ochreous in colour, and is furnished with long stout white hairs, of which a subdorsal series is on each side, with one long hair springing from the apex of each tubercle; there are besides other lateral series, and numerous hairs projecting forwards in front of the head and backwards over the anal segment. The full-grown larva is the most beautiful known to me among the *Lycænidæ*. It is about $\frac{11}{16}$ of an inch in length, of the exact shade of green of the leaves on which it feeds, the head pale ochreous and more completely hidden than in any larva I have ever seen, and even when the

animal eats it is not visible from above, the second segment entirely enclosing it. The second segment is half as wide as the following, the third, fourth, and fifth rapidly and progressively enlarging, the next three segments as rapidly decreasing in size, the remainder subequal. The second segment is quite unmarked, the third to the thirteenth have a subdorsal series of short oblique pale yellowish-green lines, between which the ground-colour is paler than the rest of the body; there is a dark green dorsal line; on each side of the ninth segment there is a prominent pure dead white somewhat diamond-shaped mark. The twelfth segment bears two most extraordinary structures, which consist of two diverging cylindrical rigid pillars, arising from the subdorsal region and of a pale green colour. When the insect is touched or alarmed from each pillar is everted a deep maroon tentacle as long as the rigid pillar, bearing at its end long parti-coloured hairs, the basal third of each hair being black, the upper two-thirds white. The maroon tentacle with its long hairs spread out like a circular fan or rosette is whirled round with great rapidity in a plane parallel to the body, its use being almost certainly to frighten away its enemies, as this larva, as far as I am aware, is not attended by protecting ants, and lacks the honey-gland on the eleventh segment present in so many lycænid larvæ which are affected by ants. PUPA is almost as curious an object as the larva, reminding one of a lump of green jelly. Its colour is pale transparent light green, the wing-cases being bluish green and quite smooth, the rest of the pupa covered with tiny pits, giving it a rough appearance under a magnifying glass. It is entirely without angulations or processes, its widest portion is the very broad and flat base on which it rests, its length is about $\frac{7}{16}$ of an inch, breadth $\frac{6}{16}$, height $\frac{2}{16}$, the anal end produced into an obtuse point. There is a conspicuous heart-shaped pale ochreous mark on the top of the thorax, the pits upon it above-mentioned being filled in with reddish pigment, there are also three regular rows of tiny ochreous dots on the abdominal segments on each side, the divisions between the segments hardly visible. I made the following notes when breeding this species. June 24th. Eggs laid. June 27th. Larvæ hatched, placed on young leaves of *Derris scandens*, Benth. (they also eat *Heynea trijuga*, Roxb., in Calcutta). June 28th. Larvæ grown enormously. They eat only the young leaves, and only the parts near the stalks and midribs, perforating them with holes, they also eat the young stalks and flower buds. June 29th. Changed skins to-day. When first hatched the larvæ are pale ochreous and hairy, just before changing their skins they turn green, and are without any protruberances, after the first moult they are quite naked, green, with two black horns on the twelfth segment. Before changing they fasten themselves with silk to a leaf on the underside near the midrib. June 30th. Larvæ now eating edges of leaves. July 1st. Changed skins again, appearance much as before, only that they have a kind of white saddle-mark on the ninth segment, horns the same colour as rest of body. They devour their old skins. July 3rd. Changed their skins again to-day, colour chocolate-brown, marked with green and white. July 5th. Probably changed their skins again to-day. Colour green. They now eat the young green stalks. July 7th. Changed to pupæ. Before changing they lose all their bright colouring and markings, becoming a dull uniform green of the same shade as the leaves of their food-plant. Butterflies emerged in three or four days. In Horsfield and Moore's Catalogue the larva of *C. thetis* is portrayed with numerous vermilion markings on the dorsal region, and the pillars also of that colour, the white mark which is so conspicuous on each side of the ninth segment not being shown at all.

I possess numerous examples of *C. thetis* from Bholahât in the Malda District, from Calcutta, Barrackpore, Orissa, Ganjam, Karwar, Bombay, Poona, North Canara, and Ceylon. Typically, I can distinguish this form from the next species, *C. arcuata*, Moore, by the inner edges of the black margin at the apex of the forewing being nearly at right angles, in *C. arcuata* the inner edge is evenly rounded. The inner edge of the black border on the costa is sometimes jagged and sometimes even, and cannot be used as a distinguishing character. In Ceylon it occurs in the "Eastern Province between Kandy and Trincomalee in forest land. Taken in August while settling on the ground" (*Hutchison*). "Kandy. Rather scarce" (*Wade*). Mr. G. F. Hampson writes: "It is a rare species on the

Nilgiris. The female takes two forms, in both of which the ground-colour is black with a patch on the disc of each wing, which in one form is white, in the other copper-coloured." I have noted that it is "Not uncommon in Calcutta amongst trees and high bushes, and generally settles with closed wings on the underside of a leaf out of reach. The female is dimorphic, one form having the disc of the wings above white, the other having them ochreous." I have only bred the white form of the female, which agrees exactly with the figures of the species by Drury and Cramer. As noted under *C. phædrus*, this species does not appear to be confined to any particular locality, and intermediates between it and *C. phædrus* are not difficult to find.

Mr. Doherty records* *C. thetis* from the Kali Valley, Kumaon. I think his identification must be incorrect, unless he takes the extremely broad view that only one species of the genus occurs in India, as all the specimens of *Curetis* I have seen from the Himalayas are of the *bulis* group, the *thetis* group occurring only (except in a few hilly places) in the plains of India below the Himalayas to Ceylon, and from Assam to Singapore.

851. **Curetis arcuata,** Moore.

C. arcuata, Moore, Proc. Zool. Soc. Lond., 1883, p. 523, pl. xlviii, fig. 3, *male*.

HABITAT: Malabar.

EXPANSE: ♂, ♀, 1·4 inches.

DESCRIPTION: "Of smaller size than *C. thetys* [=*thetis*], Drury, the *forewing* less acuminate at the tip, the costal band on the UPPERSIDE comparatively broader, not jagged on its inner edge, and is curved below the apex to the posterior angle. On the *hindwing* the costal band spreads over the costal nervure and extends to the end of the first subcostal nervule. FEMALE. UPPERSIDE, *forewing* with the white patch confined more to the disc. *Hindwing*, with the curved white band narrower." (*Moore*, l. c.)

This species, of which I possess a specimen named by Mr. Moore from Bangalore, can typically be distinguished from *C. thetis* by the inner edge of the outer black border to the forewing on the upperside being evenly rounded, not at right angles below the apex as in that species. I possess specimens from Bangalore, Rutnagherry, North Canara, and Bholahât in the Malda District. From the former place I possess specimens of *C. phædrus*, and from Bholahât I have typical *C. thetis*, so *C. arcuata* appears also to be confined to no particular and well-defined region.

852. **Curetis gloriosa,** Moore.

C. gloriosa, Moore, Proc. Zool. Soc. Lond., 1883, p. 522, pl. xlviii, fig. 1, *male*.

HABITAT: Sylhet.

EXPANSE: 1·75 to 2·00 inches.

DESCRIPTION: "MALE. UPPERSIDE, *both wings* dark coppery-red. *Forewing* with a blackish-brown marginal border curving broadly from base of the costa to posterior angle. *Hindwing* also with a broad blackish-brown marginal border, and a suffused dusky basal area. FEMALE. UPPERSIDE, *both wings* dark brown. *Forewing* with broad golden-yellow discal area. *Hindwing* with a narrow curved discal streak." (*Moore*, l. c.)

The Indian Museum, Calcutta, possesses two males and a female of this species. They are of very large size, expanding two inches, the outer black border on the upperside of both wings is very broad, in the hindwing broader than in any other species of this group. Their nearest ally is *C. æsopus*, Fabricius, from which their large size and the broad black margin to the hindwing in the male on the upperside will distinguish them. In the Phayre Museum, Rangoon, and in Colonel Swinhoe's collection, are single males of this species taken in Rangoon which agree well with typical Sylhet specimens.

853. **Curetis saronis,** Moore.

C. saronis, Moore, Proc. Zool. Soc. Lond., 1877, p. 587; *C.? saronis*, Wood-Mason and de Nicéville, Journ. A. S. B., vol. lv, pt. 2, p. 364, n. 109 (1886).

* "*Curetis thetis*, Drury (*thetys*). Kali Valley, Kumaon, not common. Except in the outline of the wings, which is that of the typical *thetis*, my Kumaon specimens do not differ from *bulis*. The red is confined to a rather small area of the forewing, indented from above, and not reaching the hind margin." (*Doherty* Journ. A. S. B., vol. lv, pt. 2, p. 127, n. 131 (1886).

HABITAT : South Andaman and Nicobar Isles ; Cachar.

EXPANSE : ♂, ♀, 1·4 inches.

DESCRIPTION : "MALE and FEMALE. Nearest allied to *C. insularis*, Horsfield, of Java, but smaller, the *forewing* on the UPPERSIDE of the MALE having the black border less angulated on its inner margin ; the UNDERSIDE of *both wings* is white with slightly dusky undulated lines, *C. insularis* being cream-coloured, and with rather prominent undulated lines. FEMALE, UPPERSIDE, *both wings* dark brown, with golden-yellow disc." (*Moore*, l. c.)

I possess numerous specimens of both sexes of this species from the Andaman Isles, and one male and numerous females from the Nicobar Isles, where it occurs on Kamorta, Nankowri, Trinkut, and Great Nicobar. Females from the Andamans seem to be fairly constant, but from the Nicobars I possess some specimens with a large golden-yellow patch on the upperside of the forewing and a smaller one on the hindwing, and others in which the patch on the forewing is reduced to a small ochreous suffusion on the disc, and on the hindwing the patch much smaller and whitish, and every intergrade between these two extremes. Numerous specimens taken by Mr. Wood-Mason in Cachar are indistinguishable from *C. saronis* in either sex. The solitary character which distinguishes the male of this species from *C. arcuata*, Moore, is the greater breadth of the outer black margin to the hindwing on the upperside. The female of *C. arcuata* is said to be white above, while that sex of *C. saronis* is ochreous. The colour of the underside distinguishes it from *C. insularis*.

854. **Curetis felderi**, Distant.

C. felderi, Distant, Rhop. Malay., p. 203, n. 3, pl. xxiv, fig. 3, *male* ; pl. xxii, fig. 26, *female* (1884) ; id., Moore, Journ. Linn. Soc. Lond., Zoology, vol. xxi, p. 39 (1886).

HABITAT : Burma, Perak, Province Wellesley, Sungei Ujong, Singapore.

EXPANSE : 1·6 to 1·9 inches.

DESCRIPTION : "MALE. Wings less angular than in *C. æsopus*, Fabricius, the apex of the forewing and the anal angle of the hindwing more rounded and less produced. UPPERSIDE, *both wings* coloured as in *C. æsopus*. *Forewing* with the black area smaller, the apical portion more regularly concave interiorly, and narrower at the outer angle. *Hindwing* with the outer black margin narrower. UNDERSIDE, *both wings* pearly-white, the markings as in *C. æsopus*, but the fasciæ darker and more continuous, the apex of the *forewing* also broadly infuscated. FEMALE. UPPERSIDE, *both wings* pale orange-yellow. *Forewing* with the costal margin, the apex, outer margin, and outer half of inner margin broadly dark brown. *Hindwing* wholly dark brown, with the exception of a large discal orange-yellow patch extending from the base of the third median nervule to the apex of the wing. UNDERSIDE, *both wings* as in the male, but with the fasciæ darker, broader, and more regularly curved and continuous. *Body* above dark brown ; sternum and *legs* greyish-white, tibiæ and tarsi annulated with brown ; *palpi* greyish-white, their apices dark brown."

"This species is allied to *C. insularis*, Horsfield (with the type of which in the Horsfield collection I have carefully compared it), but by the underside, in particular, it is rendered very distinct." (*Distant*, l. c.) This species is certainly distinct from *C. insularis*, but I am unable to find the smallest character by which to distinguish it from *C. saronis*, Moore, from the Andaman Isles. In the Indian Museum, Calcutta, is a male specimen from Perak, named by Mr. Distant, and another from Mergui captured on 21st March, 1882, by Dr. J. Anderson, and named by Mr. Moore, so I am sure of my identification of the species.

855. **Curetis æsopus**, Fabricius.

Papilio æsopus, Fabricius, Sp. Ins., vol. ii, p. 125, n. 565 (1781) ; idem, id., Mant. Ins., vol. ii, p. 79, n. 719 (1787) ; id., Herbst, Pap., pl. cccxxv, figs. 3, 4, *female* (1804) ; *Hesperia æsopus*, Fabricius, Ent. Syst., vol. iii, pt. i, p. 307, n. 164 (1793) ; *Curetis æsopus*, Hübner, Verz. bek. Schmett., p. 102, n. 1070 (1816) ; id., Distant, Rhop. Malay., p. 202, n. 2, pl. xxiv, fig. 12, *male* (1884) ; p. 451, n. 2, pl. xliv, fig. 14, *female* (1886) ; *Anops æsopus*, Butler, Cat. Fab. Lep. B. M., p. 160, n. 1 (1869).

HABITAT : East Indies (*Fabricius*) ; Perak, Province Wellesley (*Distant*) ; Moulmein (*Butler*).

EXPANSE: 1·6 inches.

DESCRIPTION: "MALE. UPPERSIDE, *both wings* closely resembling those of *C. malayica*, Felder, but the *forewing* having the black area much reduced, and not widened at the outer angle nor extending along the inner margin. UNDERSIDE, *both wings* pearly-white. *Forewing* with a pale bluish oblique lunulated fascia, outwardly and narrowly margined with blackish, commencing at the upper discoidal nervule, and a marginal series of small black spots preceded by an obscure pale bluish lunulated fascia. *Hindwing* with a short oblique pale bluish fascia commencing on the costal nervure a little before the apex, some short and similar indistinct fasciæ on the disc, and a marginal series of black spots preceded by a pale bluish lunulated fascia as on the forewing. *Body* above fuscous, beneath with the sternum and *legs* greyish-white, femora and tibiæ more or less annulated with brownish; *abdomen* pale brownish; *palpi* greyish-white, with their apices black." (*Distant*, l. c.)

Fabricius described this species from a female. I do not give his description, as it will apply to any white female of this group. He gives the *Papilio thetis* of Drury, the type of which was also a female, as a synonym of *C. æsopus*; in this he has been followed by Messrs. Kirby and Moore, but not by Messrs. Butler and Distant. As figured by the latter, the female of *C. æsopus* is absolutely similar in shape and markings to specimens of *C. thetis* bred by me in Calcutta, the white patches of both wings are moderate in size, and the wings are evenly rounded. On the underside, however, the markings are more prominent and linear than is usual. Mr. Distant's figure of the male of *C. æsopus* shows that the black border at the apex of the forewing is extremely wide, measuring ·4 of an inch at its widest part, in this respect being only equalled by *C. gloriosa*, Moore, and *C. felderi*, Distant, and extending a short distance along the inner margin. Mr. Distant says that the black border does not extend along the inner margin, but in his figure and in a male specimen from Perak named *C. æsopus* by him and now in the Indian Museum, Calcutta, this character certainly exists, and thereby constitutes this species a distinct connecting link between the two groups, *thetis* and *bulis*, which in India proper I have considered to be possibly separable.

C. insularis, Horsfield, occurring in the Malay Peninsula and Java, appears to me to be a distinct species from the small material I possess. Its description is appended.*

In the second group of the genus, six species have been recorded from Indian limits. In this group we have two characters to deal with, a structural one and a colour one. With

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* *Curetis insularis*, Horsfield. *Phædra insularis*, Horsfield, Cat. Lep. E. I. C., p. 125, n. 52 (1829); *Anops insularis*, Horsfield and Moore, Cat. Lep. Mus. E. I. C., vol. i, p. 53, pl. 1*a*, fig. 14, *male* (1857); *Curetis insularis*, Distant, Rhop. Malay., p. 451, n. 5, pl. xli, figs. 6, *male*; 7, *female* (1886). HABITAT: Java (*Horsfield*); Perak, Selangor, Kwala Lumpor, all in the Malay Peninsula (*Distant*). EXPANSE: *Male*, 1·4 to 1·7; *female*, 1·4 to 1·6 inches. DESCRIPTION: "MALE. UPPERSIDE, *both wings* with a bright cupreous lustre inclining as the light varies to reddish-brown; exterior and posterior borders of the forewing and posterior border of the hindwing black, in the former the intermediate boundary forms a bold curve leaving a broad apex, in the latter the inner edge is slightly waving and evanescent. *Hindwing* gradually attenuated towards the anal region, with a slightly rounded inner apical angle; the concave inner margin which receives the abdomen is paler and covered with delicate hair of a sooty tint. UNDERSIDE, *both wings* satin-white, the colour being spread in an opaque pulverulent stratum uniformly over the whole surface, and covered with a silvery slightly glaucous gloss. *Both wings*, have along their posterior margin a grayish line, behind the disc two very delicate waving strigæ of a blackish tint pass regularly across both pairs, the anterior being more pronounced; just within the hinder margin is a series of very minute black dots, and near the middle of the inner margin stands a solitary dot of the same colour; on the disc the indication of a transverse brownish litura is faintly observed, which however is more lengthened and distinct in the hindwing. *Body* and *abdomen* above glaucous inclining to brown with a lengthened down of the same colour; underneath yellowish-white and pulverulent; *legs* of the same colour with obscure brown spots. *Antennæ* brown." (*Horsfield*, l. c.) "MALE. UPPERSIDE, *both wings* shining sanguineous. *Forewing* with the base brownish, the costal, apical, and outer marginal areas black. *Hindwing* with the outer margin black, the basal, abdominal, and anal-angular areas brownish. UNDERSIDE, *both wings* pale creamy-white with a stramineous tinge, crossed beyond the discoidal cells by a waved and more or less broken linear blackish fascia inwardly margined with bluish-grey, with a submarginal series of small black spots. *Body* above dark brownish, beneath more or less concolorous with the wings. FEMALE. UPPERSIDE, *both wings* dark chocolate-brown. *Forewing* with a large discal orange-yellow patch which occupies the lower portion of the cell, is continued beneath the cell, and extends to a short distance from the outer margin. *Hindwing* with a small curved orange yellow patch extending from the first subcostal nervule to about the end of the cell. UNDERSIDE, *both wings* as in the male." (*Distant*, l. c.)

There are two male specimens of this species from Perak in the Indian Museum, Calcutta. On the upperside *C. insularis* is nearest to Perak specimens of *C. æsopus*, Fabricius, but the black border of the forewing on the upperside does not extend at all along the inner margin as it does in that species. The underside is pale straw colour, which together with the discal straight linear fascia across both wings, distinguishes it from all other species known to me.

regard to the first, we have *C. angulata*, Moore, which has the apex of the forewing highly acuminated, indeed almost falcate, and the hindwing strongly angulated at the middle of the outer margin and at the anal angle. The other extreme is *C. discalis*, Moore, which nearly approaches the rounded outline of *C. thetis*, Drury. Between these two extremes we have every gradation. With regard to the colour character we have an unnamed form in which the red coloration of the upperside of the male is nearly as extensive as in the *thetis* group, but the outer black bordering gives off a black tooth at the end of the cell of the forewing, and is also continued along the inner margin for one-third its length, neither of which features ever occurs in the *thetis* group. In the other extreme we have *C. discalis* again, in which the red coloration on the upperside of the male is confined to a small discal patch on each wing. From Sikkim I have before me as I write about two hundred and fifty specimens of the male, and fifty specimens of the female, and I find every gradation both in outline and coloration between all the forms, and can match every described species of the group from them. In India this group occurs in the Himalayas, Assam, and from Burma to Singapore, also on the continent of India in Orissa, in the Central Provinces, and as far south as the Wynaad, but in all these districts it occurs in the hills only.

In the second group, the outer black border on the upperside of the forewing of the male always extends along the inner margin. The outline of the wings in both sexes is very variable.

Key to the Indian species of Curetis.

Second group.

B. Outer black border on upperside of male extending along the inner margin.
- *a.* Apex of forewing highly acuminate, outer margin of hindwing highly angled in the middle and at anal angle.
  - 856. C. ANGULATA, Western Himalayas.
- *b.* Apex of forewing acuminate, outer margin of hindwing slightly angled in the middle and at anal angle.
  - *a*¹. Disco-cellular nervules on upperside of forewing in male marked with black.
    - 857. C. DENTATA, Western Himalayas, Sikkim.
  - *b*¹. Disco-cellular nervules on upperside of forewing in male undefined by a black tooth owing to the black bordering covering them.
    - 858. C. BULIS, Upper India.
- *c.* Apex of forewing acute, outer margin of hindwing evenly rounded.
  - *a*¹. Red area on upperside of male large.
    - 859. C. MALAYICA, Burma, Malay Peninsula.
  - *b*¹. Red area on upperside of male smaller.
    - 860. C. STIGMATA, Burma.
  - *c*¹. Red area on upperside of both wings of male reduced to a small discal patch on each wing.
    - 861. C. DISCALIS, Nepal, Sikkim.

856. Curetis angulata, Moore.

C. angulata, Moore, Proc. Zool. Soc. Lond., 1883, p. 522, pl. xlviii, fig. 2, *male*.

HABITAT: N.-W. Himalayas.

EXPANSE: ♂, ♀, 1·75 inches.

DESCRIPTION: "MALE. From typical *C. bulis*, Doubleday and Hewitson,* this species differs in the *forewing* being pointed and acuminated at the apex; the red area on the UPPERSIDE is paler and broader, extending to the posterior margin towards the base, the dentate mark at the end of the cell is also prominent. The *hindwing* has the exterior margin much produced to an angle in the middle, and the anal end more produced, the red area is also paler, and extends from the costal edge broadly over the disc, leaving only an exterior marginal blackish band and a suffused medial basal area. FEMALE with similar outline of wings, UPPERSIDE, *both wings* with broad white discal areas." (*Moore*, l. c.)

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* *Anops bulis*, Doubleday and Hewitson, Gen. Diurn. Lep., vol. ii, p. 473, n. 3, pl. lxxv, fig. 5, *male* (1852).

I possess a single male taken by Major C. H. E. Adamson at Bhamo, Upper Burma, in June, which agrees with the figure of this species in coloration and outline; I have other males from Sikkim and Bhutan which agree in outline but not in the extent or shade of the red on the upperside. I possess many females from Sikkim which agree in shape with the figure of this species, but are variable in the amount of white on the upperside of both wings, and a single female from Masuri in the Western Himalayas, taken by Mr. P. W. Mackinnon in August, which is the locality from which *C. angulata* was described, also one from the Central Provinces taken by Mr. J. A. Betham.

857. **Curetis dentata,** Moore.

C. dentata, Moore, Proc. Zool. Soc. Lond., 1879, p. 137; idem, id., l. c., 1882, p. 244.

HABITAT: N.-W. Himalayas, Deyra Doon, N.-W. India (*Moore*).

EXPANSE: 1·62 inches.

DESCRIPTION: "MALE. *Forewing* slightly concave, but not scalloped out on exterior margin. UPPERSIDE, red patch very broad, with a dentate black mark at the end of the cell, and its outer border sinuous. *Hindwing* convex and slightly sinuous on its exterior margin, with the red broadly diffused; outer border narrow; the basal streak and abdominal border dusky black. FEMALE. UPPERSIDE, *both wings* with fuliginous-brown borders and white discal patch; the dentate mark on the *forewing* distinct."

"Distinguished from *C. bulis*, Doubleday and Hewitson, in the forewing not being falcate, and in the exterior margin of the hindwing not being angular in the middle." (*Moore*, l. c.)

I possess a male specimen of this species named by Mr. Moore from Sikkim. It has the red area large, a prominent tooth of black given off from the black costal border and covering the disco-cellular nervules of the forewing; the red area occupying all but the outer margin somewhat broadly, the abdominal margin and a broad streak from the base to the middle of the wing above the subcostal nervure of the hindwing. In my collection are numerous specimens of this form from Masuri and Mundi in the Western Himalayas, Sikkim, Assam, Burma, Pachmari in the Central Provinces, Orissa, and the Wynaad. By insensible gradations they pass into the highly angulated form, *C. angulata*, in one direction, and into the more rounded outline of *C. bulis*, without the tooth in the forewing, in the other direction.

858. **Curetis bulis,** Doubleday and Hewitson.

Anops bulis, Doubleday and Hewitson, Gen. Diurn. Lep., vol. ii, p. 473, n. 3, pl. lxxv, fig. 5, *male* (1852); id., Horsfield and Moore, Cat. Lep. Mus. E. I. C., vol. i, p. 53, p. 96 (1857); id., Hewitson, Ill. Diurn. Lep., p. 15, n. 2, pl. iv, figs. 1, 2, *male variety* (1863); *Curetis bulis*, Doherty, Journ. A. S. B., vol. lv, pt. 2, p. 127, n. 132; id., Staudinger, Ex. Schmett., p. 279, pl. xcvi, *male* (1888).

HABITAT: Upper India (*Doubleday* and *Westwood*); North India (*Moore* and *Hewitson*); N. India, Darjiling, Bhutan, Sylhet (*Horsfield* and *Moore*); Sarju, Kali, and Gori Valleys, 2-5,000 feet, Kumaon (*Doherty*); Sikkim (*Staudinger*).

EXPANSE: ♂, 2·0 inches.

DESCRIPTION: "MALE. UPPERSIDE, *both wings* dark glossy brown. *Forewing* with the apex acute, a large medial orange spot. *Hindwing* with the anal angle acute, a large orange spot near the apex. UNDERSIDE, *both wings* lustrous white, irrorated throughout with minute black dots; crossed near the middle by a nearly straight ill-defined band slightly tinted with lilac, and bordered below by a waved black line, commencing *near the apex* of the forewing and ending below the middle of the abdominal fold, sometimes continuous, sometimes broken where the wings meet; a line of minute black spots near the outer margin. *Hindwing* with a second very indistinct broken band beyond the middle. The male of *A.* [= *C.*] *bulis* very nearly resembles the dark females of *A. thetys* [= *thetis*]; it may be always readily known from the numerous varieties of *A. thetys* not only by the peculiar form of its wings, but also by the position of the transverse band of the underside, which is nearer the apex of the forewing, and crosses the hindwing at the end of the cell and in a line with the disco-cellular nervules."

(*Hewitson*, l. c.) "FEMALE. UPPERSIDE, *both wings* distinguished by the white patches being larger [than in *C. thetis*]. *Forewing* having a disco-cellular dentiform mark of black. UNDERSIDE, *both wings* creamy-white, with a darkish band running from the anterior angle of the forewing in a straight line to the anal angle of the hindwing, the whole surface being covered with very minute dark brown dots." (*Horsfield* and *Moore*, l. c.)

Mr. Doherty remarks (l. c.) "Male as in *C. thetis*, the red of the forewing occupying most of the cell, but not extending above the second median nervule on the disc, the hind margin widely black. Female with a large white medial area on the forewing indented at the end of the cell. Hindwing with a small lunular white patch on the disc, extending to the whitish costa. It thus seems to resemble *C. dentata*, Moore, in colouring, but the hindwing, like the forewing, is very strongly angled. My specimens [from Kumaon] vary remarkably in size. Though the prehensores are very complicated in this genus, I have not been able to detect the slightest difference between those of the two species (?) here called *C. bulis* and *C. thetis*."

"One male from Ponsekai, Tavoy, which agrees in markings and colour with the two figures above quoted, but in the angulation of both wings is about intermediate between them." (*Elwes* and *de Nicéville*, Journ. A. S. B., vol. lv, pt. 2, p. 428, n. 90, 1886).

The figure of the type of this species shows a form with the apex of the forewing very acute, the outer margin nearly straight, no dentate black mark at the end of the cell, the red area on both wings somewhat large, but more restricted than in typical *C. dentata*; the hindwing evenly rounded, not at all angulated in the middle. It is the commonest form in Sikkim and Assam, and I possess a single specimen from the Wynaad. In Sikkim it runs into *C. angulata* as regards its outline, and into *C. dentata*, *C. discalis*, and *C. malayica* as regards its coloration, and I am quite unable to draw the line between any of these species with any satisfactory results. Hewitson's and Staudinger's figures are not typical, but appear to represent the form *angulata*, Moore.

859. **Curetis malayica**, Felder.

Anops malayica, Felder, Reise Novara, Lep., vol. ii, p. 221, n. 241, pl. xxviii, fig. 18, *male* (1865); id., Butler, Trans. Linn. Soc. Lond., Zoology, second series, vol. i, p. 546, n. 1 (1877); *Curetis malayica*, Distant, Rhop. Malay., p. 202, n. 1, pl. xxii, fig. 28, *male* (1884); id., Moore, Journ. Linn. Soc. Lond., Zoology, vol. xxi, p. 39 (1886); *C. ? malayica*, Elwes and de Nicéville, Journ A S. B., vol. lv, pt. 2, p. 428, n. 89 (1886).

HABITAT: Mergui Archipelago (*Moore*); Burma (*Distant*); Malacca interior (*Felder*).

EXPANSE: ♂, 1·9 inches.

DESCRIPTION: "MALE. UPPERSIDE, *both wings* coppery-reddish. *Forewing* with the costal border blackish-fuscous, emitting a slender tooth at the transverse vein [disco-cellular nervules], continued over the apical triangle rather broad inwardly excised, and merging into the blackish-fuscous anal triangle and losing itself in the dusky powdering of the inner margin. *Hindwing* with a powdery streak adjoining the subcostal nervure, and with the external margin powdery, broader hindwards, both blackish-fuscous, the apical half of the costa fuscous, the anal region darker. UNDERSIDE, *both wings* somewhat silvery-whitish, dotted with black, an external undulate striga of black atoms interruptedly broken, another submarginal obsolete, and black dots within the margin. *Forewing* with three minute black subcostal dots."

"Most nearly related to *A*. [=*C*.] *bulis*, Westwood and Hewitson, resembles the figure of the upperside of the hindwing in Moore's *A. santana* [=*C. phædrus*, Fabricius, from Java], differs from it, however, in having the anal angle of the hindwing less prominent." (*Felder*, l. c.)

"The female of this species has probably the ground-colour white, instead of red, as obtains in the female sex of *C. bulis* and *C. æsopus*." (*Distant*, l. c.)

"One male from Tavoy and four from Ponsekai agree more closely with the figure of this species than with any other, but differ from it on the upperside of the hindwing in the black margin being broader and inwardly diffused, not sharply defined, narrow, and even, as in Felder's figure. These specimens agree exactly with some from Sikkim, in which locality there appears to be every gradation between this species and the most highly angulated *C. bulis*, Doubleday and Hewitson." (*Elwes* and *de Nicéville*, l. c.)

In the Indian Museum, Calcutta, is one male from Perak named *C. malayica* by Mr. Distant, and one from Mergui so named by Mr. Moore. They agree fairly well with the figure of this species, which shows the red area on the upperside of the forewing somewhat large, a slender tooth at the disco-cellular nervules, and the base of the wing powdered with dusky; the hindwing has some black powdering anteriorly against the subcostal nervure, the abdominal margin powdered with dusky, and a narrow even outer black border. I possess specimens from Rangoon, the Donat range, and the Thoungyeen forests which I consider to represent this species. They are variable in the extent of the black coloration on the hindwing, and some of them lack the black tooth in the forewing. The specimen named by Mr. Distant in particular agrees almost to the minutest particular with the one named *C. dentata* by Mr. Moore, it seems therefore that this species is as ill-defined and variable as most of the others.

860. **Curetis stigmata**, Moore.

Anops stigmata, Moore, Proc. Zool. Soc. Lond., 1879, p. 138; *Curetis stigmata*, id., Journ. Linn. Soc. Lond., Zoology, vol. xxi, p. 39 (1886).

HABITAT: Moulmein, Mergui, Burma.

EXPANSE: 1·62 inches.

DESCRIPTION: "MALE. *Forewing* short, apex not falcate, exterior margin slightly scalloped, the bright red patch broad and sinuous on its apical border. *Hindwing* quite convex and even along exterior margin, with a well-defined black outer border and prominent black longitudinal narrow median basal brand or streak; the abdominal border dusky."

"Has most resemblance to the male of *C. thetys*, Doubleday and Hewitson, in the contour of the wings." (*Moore*, l. c.)

In the Indian Museum, Calcutta, is a single male of this species taken by Dr. J. Anderson at Yimiki, King Island, in the Mergui Archipelago in February which has been named *C. stigmata* by Mr. Moore. The red patches on the upperside of the wings are moderately large, and there is no black tooth on the disco-cellular nervules of the forewing. I can find no character by which to distinguish it from some specimens of *C. bulis* from Sikkim, and it agrees almost exactly with the specimen of that species I possess from the Wynaad.

861. **Curetis discalis**, Moore.

C. discalis, Moore, Proc. Zool. Soc. Lond., 1879, p. 138.

HABITAT: Nepal, Darjiling.

EXPANSE: 1·37 inches.

DESCRIPTION: "MALE. Distinguished on the UPPERSIDE by the bright red of the *forewing* being confined to a narrow elongated patch, and that on the *hindwing* also confined to a small oblong lunular discal patch, which is slightly dentate on the middle of its inner border. *Forewing* somewhat short and truncate." (*Moore*, l. c.)

I possess numerous specimens of this form from Sikkim, and find that there it gradually and by almost imperceptible steps grades into *C. bulis*, Doubleday and Hewitson. Typical specimens are very distinct, as they are the darkest form found in the genus in India. The red area on the upperside of the forewing is confined to a small patch on the disc, which is separated by the black ground-colour from the base, and occupies less than the lower half of the discoidal cell, the black tooth being absent; the hindwing has an even smaller red area than the forewing. I also possess numerous typical forms sent me by Mr. S. E. Peal from Sibsagar in Upper Assam, and one from Jorehât in Lower Assam.

C. sperthis, Felder, from the Malay Peninsula, is of this group. Its description is given below.*

* *Curetis (Anops) sperthis*, Felder, Reise Novara, Lep., vol. ii, p. 222, n. 242 (1865); id., Butler, Trans. Linn. Soc. Lond., Zoology, second series, vol. i, p. 546, n. 2 (1877); id., Distant, Rhop. Malay., p. 203, n. 4, pl. xxii, fig. 27, *female* (1884). HABITAT: Malacca, interior (*Felder*); Malacca, Penang (*Butler*); Sungei Ujong (*Distant*). EXPANSE: 1·6 inches. DESCRIPTION: "MALE. UPPERSIDE, *both wings* coppery-reddish. *Forewing* with the costal border blackish-fuscous, continued on to the outer margin, broad at the apex, inwardly slightly excised, thence regularly narrowed and the internal angle covered almost up to the second third of the internal nervure. *Hindwing* with the subcostal nervure black, the costal border fuscous, running down the hinder margin rather

The sixth division that I have made in the Indian *Lycænidæ* I have called the *Thecla* group, and it contains eighteen genera, which may be divided into two subgroups: the first containing six genera, which, as a rule, possess one short tail to the hindwing from the termination of the first median nervule, though there are some exceptions, the tail being sometimes absent: the second containing twelve genera, which all possess two short tails (under half an inch in length) to the hindwing in both sexes, though one aberrant genus, *Zesius*, Hübner, has three tails in the female. In all these genera the tails arise from the terminations of the submedian nervure and first median nervule, except in *Mota*, mihi, in which they arise from the terminations of the first and second median nervules. The genus *Thamala* is also aberrant, but in another way, the outer tail from the termination of the first median nervule being much longer in the female than in the male; the inner tail is also a little longer in the female.

The first genus of the first subgroup, *Thecla*, Fabricius, as restricted in this work, is, I believe, purely palæarctic, one species only being found on our north-western frontier. It is a very plain-looking insect, upperside glossy purplish-fuliginous, the underside dull brown, with a prominent discal white line. The males are furnished with a small oblong patch of differently-formed scales at the upper outer end of the cell of the forewing on the upperside, which are wanting in the females, the neuration at this point differing in the opposite sexes. Both sexes have only two subcostal nervules to the forewing, all the other genera of the subgroup having three.

The next genus, *Zephyrus*, Dalman, is probably also purely palæarctic. Two species occur in Europe, many others are found in the northern half of Asia from the shores of the Black Sea to Japan. In India it is only found in the Himalayas and in the hilly portions of Assam; thirteen species are included in this work. There is much diversity in the coloration and markings of these species, many of them are brilliant metallic green on the upperside in the males, others are duller green in some lights, violet in other lights, others are brown with some ochreous markings on the forewing. Some species are brilliant silvery or satiny-white on the underside, as in the genera *Curetis*, Hübner, and *Drina*, mihi. One Indian species entirely lacks tails, usually however the species are tailed.

The next genus, *Euaspa*, Moore, shares with the genera *Cerydus*, Boisduval, *Paragerydus*, Distant, *Logania*, Distant, some species of *Poritia*, Moore, *Zephyrus*, Dalman, and *Liphyra*, Westwood, the peculiarity of the upper discoidal nervule of the forewing being emitted from the subcostal nervure some little distance beyond the apex of the discoidal cell, instead of at a greater or less distance before the apex of the cell as usual. The genus contain but a single species, which is strictly confined to the outer ranges of the Western Himalayas. On the upperside it is blue, the apical third of the forewing black, the disc of both wings bearing a broad white band.

The genus *Chætoprocta*, mihi, has been proposed in this work for the reception of a single "hair-streak" which has the end of the abdomen in the female thickly coated with hairs, with which the eggs of the butterfly are thickly covered after being laid on the branches of

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narrowly, the internal region darker. UNDERSIDE, *both wings* white, scarcely glossy, dotted with black, with an exterior undulate striga interruptedly broken and dots within the margin black, an evanescent striga placed between."

"Smaller than the preceding species [*C. malayica*, Felder], and differs distinctly from it in being broader throughout the length of the costa, in having the terminal margin of the forewing much narrower and bulging out into a bow, in the absence of a little tooth on the disco-cellular nervule of the forewing, in having the border of the hindwing generally narrower though broadening out at the costa, and also in having shorter inner margins to both wings." (*Felder*, l. c.)

"FEMALE. UPPERSIDE, *both wings* dark chocolate brown. *Forewing* with a large discal streak, occupying nearly all the lower half of the cell, and deflected and covering more than half of the median nervules, orange-yellow. *Hindwing* with a discal patch, which is much waved and sinuated, and extends from near the apex to the third median nervule, orange-yellow. UNDERSIDE, *both wings* pearly-grey, with a small fuscous streak near the ends of the discoidal cells, a waved fuscous linear fascia a little beyond the middle, followed by a wider and more obscure fascia, and a submarginal series of dark fuscous linear spots. *Body* both above and beneath more or less concolorous with the wings. *Palpi* pearly grey, with their upper surface and apex fuscous. *Legs* pearly grey, more or less annulated with fuscous. MALE. A specimen of this sex in the British Museum resembles the female, but has the pale discal markings on the UPPERSIDE of *both wings* more reddish in hue, and the discal patch on the *hindwing* larger in size."

"I have only received a single female specimen of this apparently somewhat rare species. It is peculiar by the similarity of the sexes, the usual female characters of colour and markings being, in this species, also transferred to the other sex." (*Distant*, l. c.)

I have not seen this species, so can offer no remarks regarding it.

the walnut trees on which the larvæ feed. The butterfly is purple on the upperside, with the outer margins broadly black. It is furnished with the usual tail. It occurs only, as far as I know, in the Western Himalayas.

The genus *Chrysophanus*, Hübner, the species of which are often called "Coppers" from the coloration of the upperside, appears to occur in almost every large division of the earth except the Malay Peninsula and Archipelago. In India they are only to be found in the Western Himalayas and the bordering hilly countries to the north. There is nothing peculiar as regards the neuration of the genus, and, as in *Chætoprocta*, the upper discoidal nervule of the forewing is emitted at the end of the discoidal cell. One species entirely lacks in both sexes the copper coloration characteristic of the genus, being glossed with purple on the upperside, and moreover differs from all its congeners in possessing a well-formed tail to the hindwing. Another species is very aberrant in the coloration of the hindwing on the underside, being metallic greenish-blue, as in *Lycæna galathea*, Blanchard, *L. metallica*, Felder, and *L. omphissa*, Moore.

The last genus of this subgroup, the *Ilerda* of Doubleday, hardly differs structurally, either in the larva or imago stage, from the genus *Chrysophanus*, but it is convenient to retain it as all the species have a peculiar *facies*, and can be recognised as belonging to it at a glance. The males are usually very richly coloured on the upperside, some are ultramarine blue, some shining purple, some bright metallic green, others duller green, and one species is metallic golden bronze, a colour, as far as I know, found in no other butterfly. One species is dull purple in the male, the female being fuliginous or dull fuscous with no orange patch on the forewing; all the others have the female dull black on the upperside, with an orange patch on the forewing. The genus is found in Northern India, chiefly in the hills, in Assam, Burma, Java, and in China. It will probably hereafter be found in the mountains of the Malay Peninsula.

Genus 134.—THECLA, Fabricius. (PLATE XXVII).

Thecla (part), Fabricius, Ill. Mag., vol. vi, p. 286, n. 35 (1807); id., Leach, Edinb. Encycl., vol. ix, p. 129 (1815); id., Boisduval and Leconte, Lép. Am. Sept., p. 81 (1833); id., Westwood, Gen. Diurn. Lep., vol. ii, p. 481 (1852); id., Hewitson, Ill. Diurn. Lep., p. 69 (1865); id., Godman and Salvin, Biol. Cent.-Am., *Rhopalocera*, vol. ii, p. 8 (1887); *Cupido*, sect. C (part), Schrank, Fauna Boica, vol. ii, pt. 1, pp. 152, 217 (1801); *Strymon* (part), Hübner, Verz bek. Schmett., p. 74 (1816); id, Butler, Cat. Fab. Lep. B. M., p. 190 (1869).

FOREWING, subtriangular; *costa* arched at the base, then nearly straight to the apex; *apex* rather acute, slightly more rounded in the female than in the male; *outer margin* slightly convex or straight; *inner* margin straight; *costal nervure* ending exactly opposite the termination of the discoidal cell; *first subcostal nervule* given off from the subcostal nervure rather beyond the middle of the cell, *second* subcostal originating at about one-third from the apex of the cell in the male, at about one-fifth in the female; *subcostal nervure* reaching the apex of the wing; *upper disco-cellular nervule* absent in both sexes, *middle* disco-cellular straight, arising in the male from the upper discoidal nervule some distance beyond its origin, arising in the female exactly at its point of origin, *lower* disco-cellular of the same length as the upper, straight; *second median* nervule originating some little distance before the lower end of the cell; *submedian nervure* nearly straight. MALE, furnished with an elongated narrow shining black patch of differently-formed scales from those on the rest of the wing at the anterior end of the discoidal cell, which patch is bounded anteriorly by the basal portion of the second subcostal nervule, and extends slightly into the cell and beyond its end. HINDWING, ovate, all the margins rounded, furnished with a somewhat long narrow tail at the termination of the first median nervule, and a small anal lobe; *costal nervure* much arched at base; *first subcostal nervule* originating some distance before the apex of the cell; *disco-cellular* nervules concave, *discoidal* nervule from their point of junction; *second median* nervule originating just before the end of the cell; *internal nervure* very sinuous. *Antennæ* short, not half the length of the costa of the forewing, with a gradually-formed elongated club. *Palpi* somewhat short, obliquely porrected, second joint bristly beneath, third joint naked. *Eyes* hairy. *Legs* short, scaly.

The difference in the neuration of the forewing in the opposite sexes of species of this genus is considerable, and appears to be entirely due to the presence of the secondary sexual characters of the male. The "sex-mark" has been figured and described by Dr. Aurivillius with the corresponding part of the wing of the female as it exists in *Thecla w-album*, Knoch, a European species (Kong. Svens. Vet.-Akad. Handl., vol. v, p. 21, n. 4, pl. ii, figs. 13, 14 (1880).

In taking *T. spini*, Wiener Verzeichniss, which occurs in Europe and Northern and Eastern Asia, as the type of the genus *Thecla*, I follow Mr. S. H. Scudder,* Mr. W. F. Kirby,† and Messrs. Godman and Salvin,‡ rather than Mr. A. G. Butler,§ the last named adopting *betulæ*, Linnæus, a European and North Asiatic species. The latter is, however, the type of Dalman's genus *Zephyrus*. In restricting the genus *Thecla* to species with the characters given in the above generic diagnosis, I shut out a vast number of *Lycænidæ*, principally from South America, which have been placed in the genus by various authors, but which, in my opinion, should properly be placed in many distinct genera.

According to Dr. Lang, eight species of *Thecla* inhabit Europe, of which two—*betulæ*, Linnæus, and *quercus*, Linnæus—belong to the genus *Zephyrus*. Many species inhabit Northern Asia (Asia Minor, Syria, Persia, Amurland, China, and Japan), Mr. Leech‖ recording as many as fifteen from Japan, but many, if not all, of these species probably belong to *Zephyrus*. Many species of true *Theclæ* occur in North America, some of which have no tail, others a second tail from the termination of the second median nervule. In India only a single species occurs, the *T. sassanides* of Kollar, which is found only in the extreme north-west corner of the empire, extending into Turkestan and Persia. On the upperside of both sexes it is brown glossed with obscure purple, underside greyish-brown without gloss, both wings crossed by a discal white line, from which the name "hair-streak," popularly applied to this group of butterflies, has been derived; there is also a marginal white line more prominent on the hindwing, within which are a few black spots. All the species of this genus, as far as I know, are found in the perfect state on trees and bushes, from which they may be disturbed by beating, seldom settling on the ground or on low plants and flowers. They have a rapid flight, but seldom fly far, and rest with closed wings on the upperside of a leaf. Mr. Westwood (Gen. Diurn. Lep., vol. ii, p. 482) thus describes the transformations of the genus: "LARVA, short, onisciform, thick or linear-oblong and depressed, and attenuated at each end; generally clothed with very fine short hairs. PUPA, short and smooth, head rounded; attached by the pointed tail, and girt across the middle." The larvæ of the European species nearly all feed upon trees and bushes, *T. rubi*, Linnæus, feeding sometimes on Papilionaceous plants.

862. **Thecla sassanides**, Kollar. (PLATE XXVII, FIG. 202 ♂).

T. sassanides, Kollar, Denkschr. Akad. Wiss. Wien, Math.-Nat. Cl., vol. i, p. 51, n. 1 (1850); id., Westwood, Gen. Diurn. Lep., vol. ii, p. 486, n. 123 (1852); *T. deria*, Moore, Proc. Zool. Soc. Lond., 1865, p. 507, n. 112, pl. xxxi, fig. 11; idem, id., l. c., 1874, p. 272, n. 70; *T. mirabilis*, Erschoff, Lep Turk., p. 7, n. 17, pl. i, fig. 4, *female* (1874); id., Swinhoe, Trans. Ent. Soc. Lond., 1885, p. 342, n. 27; *Strymon mirabile*? Butler, Ann. and Mag. of Nat. Hist., fifth series, vol. ix, p. 208, n. 11 (1882).

HABITAT: South Persia (*Kollar*); Sarafschan Valley, Turkestan (*Erschoff*); Chaman, May (*Butler*); Upper Kunawur, Kashmir (*Moore*).

EXPANSE: ♂, ♀, 1·15 to 1·50 inches.

DESCRIPTION: "UPPERSIDE, *both wings* uniform dusky blackish. *Hindwing* tailed. UNDERSIDE, *both wings* pale ashy, with a white streak across both, inwardly margined with fuscous; with a series of ocelliform black dots before the external margin; the *tail* longer, black,

* Historical Sketch of the Generic Names proposed for Butterflies, p. 279 (1875).

† Journ. Linn. Soc. Lond., Zool., vol. x, p. 499 (1870).

‡ Biol. Cent.-Am., *Rhopalocera*, vol. ii, p. 9 (1887).

§ Cat. Fab. Lep. B. M., p. 181 (1869).

‖ Proc. Zool. Soc. Lond., 1887, p. 401.

the apex white. Of the size of *T. acaciæ*, Fabricius [a South European and Asia Minor species], from which, however, it differs widely in the black marginal dots of the underside, and the wider white streak." (*Kollar*, l. c.)

This description, though short, exactly applies to our species, so I have no hesitation in using it to the exclusion of Mr. Moore's name *T. deria*, the description of which being fuller is given below. Mr. Moore apparently did not know of *T. sassanides* when describing his species.

DESCRIPTION: MALE and FEMALE. "UPPERSIDE, *both wings* purple-brown. *Hindwing* with the exterior margin defined by a narrow black line, *tail* black. *Cilia* grey. UNDERSIDE, *both wings* greyish cream-colour. *Forewing* with a clear white transverse discal line with black inner border, from before the apex, between which and the exterior margin are two or more black spots. *Hindwing* with a similar transverse discal white line, extending from anterior to inner margins, between which and a marginal white line is a series of more or less distinct black spots, and two ocellated black spots [often crowned with orange], one at the anal angle, the other beyond, the space between which is grey. *Cilia* greyish." (*Moore*, l. c. in Proc. Zool. Soc. Lond., 1865.)

"I but once caught two or three of this species, on the steep bare mountain-sides over the Spiti River, altitude 11,000 feet, on a hot fine day; they were flitting about the low shrubs." (*Note by Colonel A. M. Lang, R.E.*)

Within our region *T. sassanides* has a considerable range in the Western Himalayan mountains. It occurs in Pangi near Chumba; in suitable localities in many parts of Kashmir, Baltistan, Ladak, and also in Afghanistan and Biluchistan. I have usually taken it on a grey-leaved prickly bush at about 7,000 feet elevation, and often in considerable numbers. It occurs however, at much greater altitudes.

The figure shews both sides of a male specimen from Pangi in my collection.

A very closely allied species has been described from Turkestan by Mr. Erschoff as below.* It differs only from his *T. mirabilis*, as far as I can tell from the figures of both, in having the discal white line on the underside of the forewing less prominent and ending on the first median nervule, the white line on the hindwing also less prominent.

The next two genera are unquestionably closely allied, and possess a feature in neuration which is only found in five other genera of Indian *Lycænidæ*, and consists in the upper discoidal nervule of the forewing being given off from the subcostal nervure some distance beyond instead of a little before or at the apex of the discoidal cell. *Zephyrus*, Dalman, which contains one group of the true "hair-streaks," is extremely diversified in colouring, and in many species there is a great difference in the coloration and markings of the opposite sexes. The males have no secondary sexual characters. It probably occurs throughout the Palæarctic region. The genus *Euaspa*, Moore, contains but a single species, which is restricted to the Western Himalayas. In it the sexes are alike, blue above with an outer black margin, and a patch of pure white on the disc of both wings. In neuration it hardly differs from *Zephyrus*, and the male has no secondary sexual characters.

Genus 135.—ZEPHYRUS, Dalman. (PLATE XXV).

Zephyrus, Dalman, Kong. Vet.-Akad. Hand., vol. xxxvii, pp. 62, 90 (1816); id., Wallengren, Lep. Scand., Rhop., p. 178 (1853); *Zephyrius*, Dalman, in Billberg's Enum. Ins., p. 80 (1820); *Aurotis*, Dalman, Kong. Vet.-Akad. Hand., vol. xxxvii, pp. 63, 90 (1816); *Dipsas* (part), Westwood, Gen. Diurn. Lep., vol. ii, p. 479 (1852); id., Hewitson, Ill. Diurn. Lep., p. 64 (1865).

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* *Thecla lunulata*, Erschoff, Lep. Turk., p. 7, n. 18, pl. i, fig. 5, *female* (1874). HABITAT: Sarafschan Valley, Turkestan EXPANSE: *Female*, 1·3 inches. DESCRIPTION: "FEMALE. UPPERSIDE, *both wings* uniform fuscous, *hindwing* tailed. UNDERSIDE, *both wings* fuscescent ashy, with a white lunular streak beyond the middle, inwardly margined with black, with an antemarginal series of black dots circled with white."

"Habitat in the Sarafschan Valley, flying from the 31st May. Allied to *T. mirabilis*, from which, however, it differs much in the pale cinereous colour of the underside, the whitish streak lunular and slender, not broken, and the marginal dots of the hindwing forming, not two, but one series." (*Erschoff*, l. c.)

FOREWING, large, subtriangular ; *costa* regularly arched, *apex* subacute, *outer margin* slightly convex or straight, *inner* margin straight ; *costal nervure* reaching to about half the length of the wing, terminating just opposite to the apex of the discoidal cell, *first subcostal nervule* given off from the subcostal nervure at about two-thirds the length of the discoidal cell, *second* subcostal nearer to the apex of the cell than to the base of the first subcostal, *third* subcostal originating rather nearer to the apex of the wing than of the cell ; *upper discoidal* nervule given off from the subcostal some distance beyond the apex of the cell ; *middle disco-cellular* nervule nearly straight (slightly concave), upright, *lower* disco-cellular longer than the middle disco-cellular, concave, slightly outwardly oblique ; *second median* nervule given off before the end of the cell ; *submedian nervure* straight. HINDWING, large, broadly ovate, the extremity of the first median nervule elongated into a fine tail, variable in length (very short in the European *Z. quercus*, Linnæus, and entirely absent in *Z. khasia*, de Nicéville), and the anal angle produced into a larger or smaller anal lobe ; *first subcostal nervule* arising from the subcostal nervure rather near to but before the apex of the cell ; *disco-cellular* nervules nearly in one straight line, outwardly oblique, the upper rather shorter than the lower ; *second median* nervule arising just before the lower end of the discoidal cell. *Eyes* hairy. *Antennæ* clavate, the club very gradually formed. *Palpi* somewhat long, obliquely porrected, the third joint horizontal, the second joint very bristly beneath, third joint naked.

LARVA, short, thick, onisciform, tapering towards each end, clothed with fine short hair. PUPA, short, thick, rounded.

The type of the genus is *Z. betulæ*, Linnæus, the "brown hair-streak" of England, the only other European species of the genus being *Z. quercus*, Linnæus, the "purple hair-streak." These two species are usually included in the genus *Thecla*, but they differ from the typical species of that genus in having no secondary sexual character at the end of the cell of the forewing in the male ; the upper discoidal nervule originates from the subcostal nervure far beyond the end of the cell, in *Thecla* it originates in the male before, in the female at, the apex of the cell, and perhaps most important of all, they have three subcostal nervules to the forewing, while in *Thecla* there are but two.

I am unable to give the range of the restricted genus *Zephyrus* with accuracy, as so few authors have used it. It certainly occurs in Europe, and in several portions of Asia Minor ; its head quarters appear to be in the hills of Northern India, where thirteen species occur ; it is found also in considerable numbers in China, Amurland, and Japan. The species are very variable in colouring, the male of *Z. betulæ* is brown above with some pale ochreous markings on the disc of the forewing on the upperside, the female with a prominent orange band, the underside is also orange, much brighter in the female than in the male ; *Z. quercus* is purple on the upperside of both sexes, but the colour is much restricted in the forewing and replaced by blackish in the hindwing of the female. The Indian species are all more or less green, blue, or violet (in one species) on the upper surface of the male, this colour being most magnificently metallic in several of the species, less so in others. The females widely differ as a rule from their respective males ; and in Japan according to Mr. J. H. Leech* one species, *Thecla* [*Zephyrus*] *japonica*, Murray, is polymorphic, having four distinct forms of female, and "besides these forms all the intermediates occur." The female of *Z. duma*, Hewitson, is black above, with an orange band on the disc of the forewing, that of *Z. syla*, Kollar, is more or less blue, of *Z. birupa* is blackish with two pale patches on the forewing, of *Z. icana*, Moore, and *Z. dohertyi*, de Nicéville, the females are very like that sex of *Z. duma*, but have a little purple towards the base of the forewing. The female only of *Z. katura*, Hewitson, is known ; while of *Z. khasia*, de Nicéville, *Z. zoa*, de Nicéville, *Z. ataxus*, Doubleday and Hewitson, *Z. absolon*, Hewitson, *Z. mandara*, Doherty, and *Z. pavo*, de Nicéville, the males only are known, but *Z. katura* is probably the female of *Z. ataxus*. The opposite sexes of *Z. ziha*, Hewitson, are marked and coloured exactly alike. None of the Indian species appear to be common, and some of them are very rare. All frequent woods and forests, and settle only on the leaves of trees and bushes, never on the ground.

* Proc. Zool. Soc. Lond., 1887, p. 412, n. 38.

Key to the Indian species of Zephyrus.

A. Hindwing not furnished with a tail, outer margin scalloped, apex of first median nervule slightly produced tooth-like. Male brilliant metallic green on upperside of both wings. Female unknown.

863. Z. KHASIA, Khasi Hills.

B. Hindwing furnished with a filiform tail from the termination of the first median nervule.

a. Males brilliant metallic green on upperside of both wings.

a[1]. Male, upperside, both wings with the coloration very deep green, powdery; underside, both wings dull fuliginous-black. Female unknown.

864. Z. ZOA, Sikkim.

b[1]. Males, upperside, both wings with the green coloration lighter and of a more brassy hue, evenly spread, not powdery.

a[2]. Male, underside pure silvery white, no distinct discal bands. Female unknown.

865. Z. ATAXUS, Western Himalayas, ? Darjiling.

b[2]. Male unknown. Female, upperside, forewing with large shining purple-blue patch towards base of wing, two discal orange spots; underside, dark brown, discal band of hindwing broken in the middle.

866. Z. KATURA, Western Himalayas.

c[2]. Male, underside, rufous-brown, forewing with large orange triangular patch from near inner margin. Female unknown.

867. Z. ABSOLON, India.

d[2]. Male, underside pale brown glossed with silvery, with distinct discal bands, the one on hindwing including dark line defining disco-cellular nervules. Female, upperside, dark brown, forewing with discal orange spots as in *Z. katura*, but no blue towards base of wing.

868. Z. DUMA, Sikkim, Sylhet.

e[2]. Male, smaller, discal band on underside of hindwing quite distinct from dark line defining disco-cellular nervules. Female, upperside, forewing shining blue on disc and base.

869. Z. SYLA, Himalayas.

f[2]. Male, still smaller, underside greyish-fawn colour, not at all glossed with silvery. Female, upperside, forewing with only faint traces of blue on disc and base, two pale bluish-white subapical (or discal) spots; underside as in male.

870. Z. BIRUPA, Western Himalayas.

b. Males, metallic green in some lights, violet in others, on upperside of both wings.

a[1]. Both sexes with discal band on underside of hindwing broad, including dark line defining disco-cellular nervules, not outwardly prominently defined by silvery line.

871. Z. ICANA, Western Himalayas.

b[1]. Both sexes with discal band on underside of hindwing narrow, quite separate from red line defining disco-cellular nervules, outwardly prominently defined by silvery line.

872. Z. DOHERTYI, Western Himalayas.

c. Male, upperside touched with obscure violet close to base of forewing only, hindwing entirely black. Female unknown.

873. Z. MANDARA, Kumaon.

d. Males, upperside, forewing blue or purple on disc and base, with two spots on disc placed obliquely.

a[1]. Both sexes, upperside, both wings, blue, obliquely-placed spots on forewing white.

874. Z. ZIHA, Western Himalayas.

b[1]. Male, upperside, forewing, peacock-purple, obliquely-placed spots on forewing orange; hindwing entirely black. Female unknown.

875. Z. PAVO, Bhutan, Upper Assam.

863. Zephyrus khasia, n. sp.

HABITAT: Khasi Hills.

EXPANSE: ♂, 1·55 inches.

DESCRIPTION: MALE. UPPERSIDE, *both wings* rich metallic green, the veins black, the outer margins with a broad regular black border. *Forewing* with the costa very narrowly black, the outer black border broadest at apex. *Hindwing* with the costal margin broadly black, the outer margin waved, no tail, but the termination of the first median nervule slightly produced tooth-like. UNDERSIDE, *both wings* silvery-white. *Forewing* with a fuscous bar closing the discoidal cell, a discal curved and waved fuscous band from the costa to the first median nervule, its outer edge sharply defined, its inner edge somewhat diffused; a submarginal increasing macular fuscous band from near the costa to the submedian nervure, becoming

obsolete before it reaches the costa. *Hindwing* with a faint darker line defining the disco-cellular nervules; a discal sinuous macular fascia composed of narrow fuscous fragments outwardly defined with whitish placed between the veins; a submarginal increasing series of six fuscous lunules placed between the veins; an anteciliary fuscous line, becoming obsolete towards the costa. *Cilia* white, becoming fuscescent towards the apex of the forewing.

This beautiful insect differs from every Indian species of the genus in possessing no filiform tail to the hindwing; the markings of the underside are also entirely peculiar. On the upperside it is hardly distinguishable from *Z. syla*, Kollar. It is probably nearest to "*Thecla*" *saphirina*, Staudinger,* from the island of Askold, Corea, and Yezo, Japan, which however has a distinct though short tail, the outer black marginal border of the forewing on the upperside very much narrower, and on the underside of the hindwing some yellow submarginal markings towards the anal angle, which are entirely wanting in *Z. khasia*.

Described from a single example in the collection of the Revd. Walter A. Hamilton.

864. Zephyrus zoa, de N.

Z. zoa, de Nicéville, Journ. Bomb. Nat. Hist. Soc., vol. iv, p. , n. 6, pl. A, fig. 3, *male* (1889).

HABITAT: Sikkim.

EXPANSE: ♂, 2·0 inches.

DESCRIPTION: "MALE. UPPERSIDE, *both wings* black. *Forewing* with all but the outer margin (which is somewhat broadly and evenly of the ground-colour) and the veins (which are black) clothed with powdery rich metallic iridescent dark green scales (exactly as in *Ilerda viridipunctata*, mihi); this colour in some lights is quite invisible. *Hindwing* with a patch of similar green scales in the middle of the wing, the costa and outer margin being broadly of the ground-colour, the abdominal margin a little paler fuscous. UNDERSIDE, *both wings* dull fuliginous black. *Forewing* with a deeper black disco-cellular mark outwardly defined by a fine silvery white line; an indistinct, somewhat broad, straight, blackish discal band from the costa to the first median nervule outwardly defined by a fine silvery white line; an indistinct blackish submarginal band which widens out on either side of the first median nervule, and is there rather prominent. *Hindwing* with a short blackish bar near the base of the costal interspace inwardly defined by a fine silvery white line; a narrow disco-cellular line outwardly surrounded with white, the usual W-shaped discal prominent line, silvery white inwardly, slightly defined by a narrow blackish line; the outer margin broadly sprinkled with white scales; a prominent marginal large oval deep black spot circled with orange in the first median interspace, an anal deep black spot crowned with orange, which latter colour extends on one side to the first median nervule, on the other in a narrow line for some short distance up the abdominal margin, where it is inwardly bounded by a fine black line and then by a line of turquoise-blue; a fine anteciliary white line, obsolete towards the apex. *Thorax* above anteriorly clothed with ferruginous hairs in some lights, posteriorly with green hairs; *abdomen* black above, pale fuscous below."

"This species belongs to the group which contains *Thecla* [*Zephyrus*] *tsangkie*, Oberthür, and *T. desgodinsi*, Oberthür,† from Thibet, but appears to be quite distinct from either. It differs from the former in being larger; it has no brilliant blue spots on the margin of the hindwing on the upperside on either side of the tail, and the colour of the underside is black, not brown. From the latter (of which the female only is known) it also differs in the ground-colour of the underside, and in the discal white lines being straight, instead of outwardly convex, as in *T. desgodinsi*, and in the presence of the bar in the costal interspace on the hindwing. *T. diamantina*, Oberthür,‡ which is also of this group, appears to have the green colour on the upperside of the male less powdery, and extended much nearer to the outer margin.

* Mémoires sur les Lépidoptères, vol. iii, p. 135, pl. xvi, figs. 4, 5, *male*; 3, *female* (1887); id., Pryer, Rhop. Nihonica, p. 14, n. 37, pl. iv, figs. 9A, *male*; 9B, *female* (1888).

† Etudes d'Ent., vol. xi, pp. 20, 21, pl. vii, figs. 54-56 (1886).

‡ ,, ,, ,, v, p. 18, n. 45, pl. i, fig. 1, *male* (1880).

It was described from the Isle of Askold. From the description alone *Z. zoa* appears to come evry near to '*Dipsas*' *japonica*, Murray,* but that species is said to have no disco-cellular markings on the underside, and has also a third black spot with whitish scales in the middle between the two large ones on either side of it on the underside of the hind-wing near the anal angle not found in my species. To judge of it also from the late Mr. H. Pryer's figures in his "Rhopalocera Nihonica" the male has the green coloration of the upperside much more extensive than in *Z. zoa*."

"A single specimen has been obtained by Mr. A. V. Knyvett on Tiger's Hill, above Darjiling, at 8,000 feet elevation, on 26th June, 1888." (*de Nicéville*, l. c.)

865. **Zephyrus ataxus**, Doubleday and Hewitson.

Dipsas ataxus, Doubleday and Hewitson, Gen. Diurn. Lep., vol. ii, p. 480, n. 2, pl. lxxiv, fig. 7, *male* (1852); id., Horsfield and Moore, Cat. Lep. Mus. E. I. C., vol. i, p. 31, n. 37 (1857); id., Hewitson, Ill. Diurn. Lep., p. 65, n. 2, pl. xxvi, fig. 6, *male* (1865); *Thecla ataxus*, Moore, Proc. Zool. Soc. Lond., 1882, p. 247.

HABITAT: Simla (*Westwood*); North India and Darjiling (*Horsfield* and *Moore*); Northern India (*Hewitson*); N.-W. Himalayas (*Moore*).

EXPANSE: ♂, 1·7 to 2·0 inches.

DESCRIPTION: MALE. UPPERSIDE, *forewing* with the apex broadly and outer margin less broadly and evenly black, the rest of the surface brilliant metallic green. *Hindwing* with the costa and abdominal margin broadly pale fuscous, the outer margin broadly black bearing a fine white line towards the anal angle, the rest of the surface brilliant metallic green; *tail* black, tipped with white. *Cilia* pure white throughout except from the first median nervule to the anal angle of the hindwing, where they are dusky, and along the inner margin of the forewing, where the cilia are very long and fuscous. UNDERSIDE, *both wings* shining silvery white. *Forewing* with the disco-cellular nervules defined with a fuscous line, a straight discal fuscous line from the costa to the third median nervule, often obsolete, two irrorated fuscous spots near the margin in the first median and submedian interspaces, the lower spot often absent. *Hindwing* with a broad fuscous line on the disco-cellular nervules, sometimes continued to the costa, a line parallel to it nearer the base of the wing sometimes connected at its lower end to the outer line, a spot below near the middle of the submedian interspace, still another spot below the latter recurved upwards in the internal interspace, and a small round spot above this last on the abdominal margin; a double submarginal lunular fascia, beyond which in the first median interspace is a round black spot surrounded with deep orange, the anal lobe black, outwardly defined by an orange patch, which latter is continued as a narrow line for a short distance up the abdominal margin. *Cilia* on both wings white, with a very fine black anteciliary line, which becomes broader and more prominent towards the anal angle of the hindwing.

Z. ataxus is a very rare species. In the Indian Museum, Calcutta, is a North Indian specimen from the old East Indian Museum, and three without history. In Colonel Lang's collection are four specimens taken at Masuri, 7,000 feet, in July, 1868, and Mr. P. W. Mackinnon has sent me a single specimen taken in June, 1884, and another in June, 1888, also at Masuri, which are all the specimens I have seen. I did not come across it in four years collecting in Simla, nor have I ever seen a Darjiling specimen. It is almost certain that the next species, *Z. katura*, Hewitson, is the hitherto unknown opposite sex of *Z. ataxus*.

866. **Zephyrus katura**, Hewitson.

Dipsas katura, Hewitson, Ill. Diurn. Lep., p. 65, n. 4, pl. xxvi, figs. 1, 2, *female* (1865).

HABITAT: India (*Hewitson*); Kulu, Masuri.

EXPANSE: ♀, 1·55 to 1·85 inches.

DESCRIPTION: "FEMALE. UPPERSIDE, *both wings* brown. *Forewing* pale blue from the base to the middle, followed by two small spots of orange. *Hindwing* rufous-brown. UNDERSIDE,

* Ent. Month. Mag., vol. xi, p. 169 (1875).

forewing pale rufous-brown, an oblong spot at the end of the cell of darker brown, bordered on both sides with white; a broad white transverse band beyond the middle, also bordered with darker brown; a broad submarginal band of white traversed by an indistinct line of pale brown, the margin dark brown. *Hindwing* white, with the base pale rufous-brown, crossed before the middle by a broad short band of dark brown, with below it a round spot, and near the abdominal margin a lunular spot of the same colour, a small brown spot between the lunular spot and the base of the wing; crossed beyond the middle by a broad band of brown marked near the anal angle by lunular white spots, a spot near the base of the tail, and also at the anal lobe, black bordered with orange; the outer margin and a submarginal band brown." (*Hewitson*, l. c.)

I should describe the upperside of the forewing as being fuscous; the discoidal cell, a small spot at the base of the second median interspace, a larger one at the base of the first median interspace, a long streak filling the basal two-thirds of the submedian interspace and the same portion of the internal area, rich shining purple blue; a large orange spot placed outwardly against the disco-cellular nervules, and a rather larger quadrate spot at the middle of the second median interspace.

Z. katura is almost certainly the hitherto unrecognised female of *Z. ataxus*, Doubleday and Hewitson. The probable reason why this has not been suggested before is that the brown underside of *Z. katura* presents such a different aspect from that of *Z. ataxus*, which is shining silvery white. The markings too are very different, though they occupy the same positions exactly. In the Indian Museum, Calcutta, is a small specimen taken by Mr. A. Grahame Young in the Kulu Valley, and two without history; in Colonel Lang's collection are two specimens taken in July at 7,000 feet in Masuri; and Mr. P. W. Mackinnon has sent me a single female taken in June, 1884, and another in June, 1888, also in Masuri. It will be noted that all the Masuri specimens were taken at the same time as the specimens of *Z. ataxus* mentioned above.

867. **Zephyrus absolon,** Hewitson.

Dipsas absolon, Hewitson, Ill. Diurn. Lep., p. 65, n. 3, pl. xxx, figs. 11, 12, *male* (1865).

HABITAT: India (*Hewitson*).

EXPANSE: ♂, 1·6 inches, (actual measurement of figure 1·8 inches).

DESCRIPTION: "MALE. UPPERSIDE, *both wings* gold-green. *Forewing* with the apical half dark brown. *Hindwing* with the margins brown. UNDERSIDE, *both wings* rufous-brown. *Forewing* with a large triangular space of orange on the inner margin, a pale linear rufous spot at the end of the cell, a transverse linear band of white beyond the middle bounded inwardly by rufous-brown, and a submarginal rufous band terminating beyond the middle in two dark brown spots. *Hindwing* crossed obliquely at the middle by a linear band of white, taking the form of a V near the anal angle, crossed beyond the middle by a broad rufous band bordered on both sides with indistinct lunular white spots, the black spots near the base of the tail and at the anal angle bordered with orange, the margin white. *Cilia* rufous."

"This beautiful species, with the brilliant green of *D. sila* [=*Z. syla*], Kollar, and *D. ataxus*, Doubleday and Hewitson, on the upperside, has on the underside a near resemblance to *D. betulæ*, Linnæus" [a common European and Northern Asiatic species]. (*Hewitson*, l. c.)

I have never seen this species. From Hewitson's figure of it the apex and outer margin of the forewing on the upperside are much more broadly black than in any other male Indian *Zephyrus*, and the "rufous-brown" underside is also distinctive.

868. **Zephyrus duma,** Hewitson.

Dipsas duma, Hewitson, Ill. Diurn. Lep., Suppl., p. 15, n. 14, pl. vi Suppl., fig. 15, *male* (1869); id., Staudinger, Ex. Schmett., p. 273, pl. xcv, *male* (1888).

HABITAT: North India (*Hewitson*); Sikkim (*Staudinger*); Sylhet.

EXPANSE: ♂, 1·75 to 2·00; ♀, 1·60 to 1·80 inches.

DESCRIPTION : "MALE. UPPERSIDE, *both wings* brilliant gold-green. *Forewing* with the costal margin near the apex and the outer margin dark brown [black]. *Hindwing* with one tail, the margins dark brown [black], rather broad. UNDERSIDE, *both wings* grey-brown, with a linear spot at the end of the cell, crossed beyond the middle by a broad band of dark brown, bordered outwardly with white, and below this a second band of brown. *Hindwing* with a linear band of brown, bordered inwardly with white near the base, the band at the end of the cell touching the broad medial band, the lobe black, crowned with orange, the black spot near the base of the tail circled with orange, the space between the lower brown band and the outer margin irrorated with black and white, a submarginal line of white."

"This may be only a variety of *D.* [=*Z.*] *smaragdina*, [Bremer, from Amurland and Japan]. It is, however, much larger, and, instead of having on the underside, as Bremer describes his species, a band of white bordered with brown, this has a broad brown band slightly bordered with white. Mr. Moore has an example which does not agree with either of these, shewing that there are either several very closely-allied species, or that *D. smaragdina* is subject to much greater variety than is usual in this group." (*Hewitson*, l. c.)

FEMALE. UPPERSIDE, *both wings* dark brown ; *cilia* paler brown. *Forewing* with a discal oblique orange band beyond the cell, divided by the black veins, a little variable in size. UNDERSIDE, *both wings* marked as in the male, but the ground-colour dark brown instead of grey-brown, and with no silvery gloss.

The males are fairly common in Sikkim in July, the females are very much rarer. I do not know any other locality for this fine species except Sylhet, Colonel C. Swinhoe having two male specimens in his collection from that region.

869. **Zephyrus syla,** Kollar.

Thecla syla, Kollar, Hügel's Kaschmir, vol. iv, pt. 2, p. 414, n. 4, pl. iv, figs. 7, 8, *male* (1848) ; id., Doherty, Journ. A. S. B., vol. lv, pt. 2, p. 130, n. 153 (1886) ; *Dipsas syla*, Horsfield and Moore, Cat. Lep. Mus. E. I. C., vol. i, p. 30, n. 36 (1857) ; id., Moore, Proc. Zool. Soc. Lond., 1865, p. 508, n. 114, also p. 774 ; *D. sila*, Hewitson, Ill. Diurn. Lep., p. 64, n. 1, pl. xxvi, fig. 3, *female* (1865) ; *Dipsas pholus*, Doubleday (*ined.*), List Lep. B. M., pt. 2, p. 25 ; *Amblypodia euphranor*, id. (*ined.*), l. c. (1847).

HABITAT : Himalayas (*Kollar*) ; Northern India (*Hewitson*) ; Simla (*Westwood*) ; N.-W. Himalayas, Darjiling (*Moore*) ; Dhankuri, 9-11,000 feet, N.-W. Kumaon (*Doherty*).

EXPANSE : ♂, 1·4 to 1·8 ; ♀, 1·4 to 1·7 inches.

DESCRIPTION : MALE. "UPPERSIDE, *both wings* greenish-bronze, with the border black. *Cilia* whitish. UNDERSIDE, *both wings* whitish silvery, with abbreviated fuscous fasciæ. *Hindwing* one-tailed, with two golden ocelli at the anal angle, spotted with black." (*Kollar*, l. c.) MALE. UPPERSIDE, *both wings* brilliant shining metallic green with a bronzy lustre in some lights, the outer margins broadly and evenly black. *Hindwing* with the costal and abdominal margins broadly fuscous, *tail* black with white cilia on its inner side and the tip white. UNDERSIDE, *both wings* silvery greenish-whitish, with pale fuscous markings. *Forewing* with a broad spot on the disco-cellular nervules, a discal band from the costa to the first median nervule, attenuated posteriorly, a broad submarginal band increasing in width posteriorly. *Hindwing* with a fine transverse line near the base of the subcostal interspace, two fine double lines at the end of the discoidal cell, a discal straight line from the costa to the first median nervule, attenuated posteriorly, outwardly defined with a fine white line, posteriorly continued in a W-shaped line to the abdominal margin ; an evenly curved submarginal band, with a round black spot beyond it in the first median interspace surrounded by a broad orange ring, and another black spot at the anal angle, inwardly with an orange patch, which latter is continued as a narrow line for a short distance up the abdominal margin. *Cilia* white throughout, on the underside of both wings with a fine blackish anteciliary line. FEMALE. UPPERSIDE, *forewing* with the costa somewhat broadly, the apex and outer margin widely black, the rest of the wing shining bluish-purple crossed by the black veins ; a pale bluish or whitish patch beyond the end of the cell ; with another less prominent patch placed outwardly below it in the second median interspace ; sometimes a small orange

spot below this again in the first median interspace. *Hindwing* black, more or less streaked with blue between the veins. UNDERSIDE, *both wings* like the male, but the orange spots at the anal angle of the *hindwing* of the male a deeper colour in the female.

"This species varies considerably in size, in the breadth of the brown margin on the upperside, and in the colour and position of the bands on the underside." (*Hewitson*, l. c.)

This is a widely-distributed species in the Himalayas, occurring on the outer ranges from Murree to Sikkim at any rate. I have always taken it flying about low oak-trees; Colonel Lang writes of it "Observed in a richly-wooded North-West Himalayan glen, flitting up and down the stream, pitching on moist rocks or pieces of wood in mid-stream." Also "Rare in Kumaon, taken in June at the top of Cheena, Naini Tal, 8,600 feet." In Sikkim it appears to be rare. Mr. Otto Möller possesses two pairs only.

870. **Zephyrus birupa**, Moore.

Dipsas birupa, Moore, Ann. and Mag. of Nat. Hist., fourth series, vol. xx, p. 51 (1877); *Thecla* (or *Zephyrus*) *birupa*, Doherty, Journ. A. S. B., vol. lv, pt. 2, p. 130, n. 152 (1886).

HABITAT: Masuri, N.-W. Himalaya (*Moore*); Outer Himalayas, Pyura and Ramgarh, 4,000-7,000 feet, Kumaon (*Doherty*).

EXPANSE: ♂, ♀, 1·30 to 1·65 inches.

DESCRIPTION: "MALE. UPPERSIDE, *both wings* metallic green, broadly margined with brown. UNDERSIDE, *both wings* greyish fawn-colour, with a transverse pale-bordered brown disco-cellular streak, a straight discal and a lunular submarginal band, the discal band on the *forewing* short, the discal band on the *hindwing* straight till where it reaches the sinuous angle, two anal black-centred bright orange spots. *Cilia* whitish. FEMALE. UPPERSIDE, *both wings* dark brown. *Forewing* slightly tinged with blue at the base, two subapical bluish-white spots." UNDERSIDE, *both wings* as in the male.

"Distinguished from *D.* [=*Z.*] *ziha*, Hewitson (of which, at present, I know only the female), in the underside being differently-coloured, the submarginal band on the forewing being uniform in colour and without the terminal spots, and in the discal transverse band on the hindwing being quite straight to where the sinuous portion turns off to the abdominal margin." (*Moore*, l. c.)

Z. birupa is usually a smaller species than *Z. syla*, Kollar, the male on the upperside of the forewing has the outer black marginal band broader and more curved; the female has much less blue on the upperside; the colour of the ground on the underside is quite different, being greyish fawn-colour in both sexes in *Z. birupa*, silvery greenish-whitish in *Z. syla*.

I have taken this species somewhat commonly at Simla about midsummer flying round small oaks, Colonel Lang has met with it at Masuri in June and July at 7,000 feet, and Mr. Doherty reports it from the outer ranges of Kumaon. It appears to be a rarer species than *Z. syla*, with a more restricted range.

871. **Zephyrus icana**, Moore.

Dipsas icana, Moore, Proc. Zool. Soc. Lond., 1874, p. 575, pl. lxvii, fig. 3, *male*; *Thecla icana*, Butler, Proc. Zool. Soc. Lond., 1880, p. 149; id., Doherty, Journ. A. S. B., vol. lv, pt. 2, p. 130, n. 154 (1886).

HABITAT: N.-W. Himalaya (*Moore*); Dhankuri, 9-11,000 feet, N.-W. Kumaon, also in Chaudans, N.-E. Kumaon (*Doherty*).

EXPANSE: ♂, 1·40 to 1·60; ♀, 1·50 to 1·66 inches.

DESCRIPTION: "MALE. UPPERSIDE, *both wings* dark brown. *Forewing* with the interior portion purplish-green, metallic only in certain lights, and traversed by the dark brown veins. *Hindwing* slightly sprinkled with metallic green scales. UNDERSIDE, *both wings* pale sap-brown. *Forewing* with a dark brown broad spot at the end of the cell, a transverse discal band decreasing in width and terminating one-third from the posterior angle, being bordered outwardly by a narrow pale line; a narrow paler brown submarginal fascia and outer border. *Hindwing* with a dark brown broad median transverse band including a disco-cellular spot, the band pale-bordered on both sides and terminating above the anal

angle in a zigzag line, a paler brown lunular submarginal fascia and outer band, a black-bordered orange patch at the anal angle containing two black spots joined by a blue streak." (*Moore*, l. c.) "FEMALE, rather larger than the male. UPPERSIDE, *both wings* dark smoky brown. *Forewing* with two bright ochreous spots placed obliquely beyond the discoidal cell." Otherwise as in the male. (*Butler*, l. c.)

On p. 268 of the "Mémoires sur les Lépidoptères," vol. iii, Dr. C. Fixsen states that "*Dipsas*" *micans*, Bremer and Grey, =*icana*, Moore. Unfortunately I have not seen the former species, which occurs in China, but to judge from the figure of it in Ménétriés' Cat. Lep. Mus. St. Peters., pl. iv, fig. 3, seems to be distinct from *Z. icana*. On the underside of the forewing in *Z. icana* the discal band is wider and ends at or before the first median nervule, in *Z. micans* it extends to the submedian nervure ; on the hindwing the discal band in *Z. icana* more or less includes the disco-cellular mark, in *Z. micans* the discal band is much narrower, and is well-separated from this mark. *Z. micans* shows an orange submarginal spot on the upperside of the hindwing in the first median interspace, this is absent in *Z. icana*.

Colonel A. M. Lang, R. E., took this species at Narkunda, near Simla, 9,000 feet, at the end of July and beginning of August ; I took it on the Jalauri pass, between the Kulu and Simla districts, at the end of July ; Mr. A. Grahame Young has taken it in Kulu at 7,000 feet in July, and at 8,000, 8,800, and 9,000 feet in September ; and Mr. Doherty has taken it in Kumaon. It does not appear to be a very common species.

872. **Zephyrus dohertyi**, de N. (PLATE XXV, FIGS. 140 ♂, 141 ♀).

Z. dohertii, de Nicéville, Journ. A. S. B., vol. lvii, pt. 2, p. 278, n. 7, pl. xiv, figs. 1, *male* ; 2, *female* (1888).

HABITAT : Western Himalayas.

EXPANSE : ♂, ♀, 1·5 to 1·7 inches.

DESCRIPTION : "MALE. UPPERSIDE, *both wings* black. *Forewing* with the black area confined to the costa narrowly, the outer margin broadly and increasingly to the anal angle, and the inner margin narrowly ; the rest of the surface extremely dark iridescent green varying to iridescent purple according to the play of the light, crossed by the black veins. *Hindwing* with some streaks of the same colour between the veins on the disc ; anal lobe and tail (the latter tipped with white) obscure reddish. UNDERSIDE, *both wings* reddish-brown, sometimes ochreous-brown ; the discoidal cells closed by a narrow red band outwardly defined with black. *Forewing* with a waved discal red band, its outer edge irregular, and defined with a fine black, then a silvery line, extending from the costa to the first median nervule ; a submarginal increasing macular dark fascia, the apical half of the outer margin reddish. *Hindwing* with a broader discal red band than in the forewing prominently outwardly defined with a silvery line ; a submarginal lunular red band, which is bent upwards at the anal angle and continued some distance along the abdominal margin, where it is inwardly defined, as are also the two lunules next it on both sides, with a fine silvery line ; a series of red lunules on the margin ; *tail* red. *Cilia* cinereous throughout. FEMALE. UPPERSIDE, *both wings* black. *Forewing* with an irregular orange spot placed outwardly against the disco-cellular nervules, and another similar spot placed below and beyond it in the second median interspace, sometimes extending diffusedly into the interspace below ; the discoidal cell and a patch in the middle of the submedian interspace rich purple (never green in some lights) ; this colour sometimes entirely absent. *Hindwing* unmarked. UNDERSIDE, *both wings* as in the male."

"May at once be distinguished from *Z. icana*, Moore, by the discal band of both wings on the underside being narrower and outwardly defined with a bright silvery line ; the two lunular marginal bands in *Z. dohertyi* on the underside of the hindwing are also more prominent and deep vermilion throughout, in *Z. icana* they are more orange, and that colour is confined to the anal angle. The discal band on the hindwing below is always distant

from the disco-cellular band, in *Z. icana* the two are run into each other, owing to the much greater breadth of the bands."

"I possess numerous specimens, including four females, of *Z. dohertyi* taken by Mr. P. W. Mackinnon at Tehri Gurhwal, near Masuri, 8,500 feet, in June; I also took four males on the Jalauri Pass, at about 9.000 feet, on the Kulu side, in July. As Mr. W. Doherty first pointed out the distinctness of this species,* I have much pleasure in naming it after him." (*de Nicéville*, l. c.)

The figures show the upper and undersides of both sexes of the type specimens from Tehri Gurhwal in my collection.

873. **Zephyrus mandara,** Doherty.

Thecla mandara, Doherty, Journ. A. S. B., vol. lv, pt. 2, p. 130, n. 155 (1886).

HABITAT: Kumaon.

EXPANSE: Not given.

DESCRIPTION: MALE. "Allied to *Z. icana*, Moore, but whereas that species is [on the upperside] metallic over the disc of the hindwing and most of the forewing, interrupted by black veins, and appears green in some lights and violet in others, this species is only touched with obscure violet close to the base of the forewing; the disc has a faint lustre, as if greasy. UNDERSIDE more rufous than *Z. icana*, the transverse discal line [of the forewing] extends to the first median nervule, slightly bent inwards at its lower end; the discal band of the hindwing is straight, the submarginal band rounded, both are tinged with reddish; a blurred, obsolescent ocellus of black and reddish anally and subanally. Outer margin of the forewing strongly convex, sinuous; outer margin of the hindwing not scalloped, abdominal margin not excavated, but straight or slightly convex. The prehensores, though generally resembling those of *Z. icana*, are quite distinct. Both are distinguished from *Z. syla*, Kollar, and *Z. birupa*, Moore, by the uncus seen from the side being divided horizontally; in *Z. icana* the upper lobe is slender, bent downwards, and projects beyond the lower; in *Z. mandara* the upper lobe is straight, and shorter than the long and massive lower lobe; the clasp (which in both species tapers obliquely upwards) here ends in a blunt, almost vertical point, while in *Z. icana* it ends in a sharp horizontal beak; the uncus in *Z. birupa* and *Z. syla* is very different, being broad and entire, when viewed from the side." (*Doherty*, l. c.)

I have not seen this species, but it can be easily discriminated apparently from its allies by the metallic coloration of the upperside being very restricted in the forewing, altogether absent in the hindwing. Mr. Doherty does not state in what part of Kumaon he took it.

874. **Zephyrus ziha,** Hewitson.

Dipsas ziha, Hewitson, Ill. Diurn. Lep., p. 66, n. 5, pl. xxvi, figs. 4, 5, *female* (1865).

HABITAT: Unknown (*Hewitson*); Kulu, Simla, Masuri.

EXPANSE: ♂, ♀, 1·2 to 1·5 inches.

DESCRIPTION: MALE and FEMALE. "UPPERSIDE, *both wings* grey-blue, the veins black. *Forewing* with the outer half dark brown, marked with two white spots. *Hindwing* with the outer margin broadly brown traversed by a line of white. *Cilia* white. UNDERSIDE, *both wings* white, with a spot at the end of the cell and a transverse band of brown beyond the middle, both with the outer margin and two submarginal bands of brown. *Forewing* with two large spots of brown near the anal angle. *Hindwing* with a black spot near the base of the tail, also a black spot at the angle, both bordered with orange." (*Hewitson*, l. c.)

I have seen but seventeen specimens of this species, one taken by Mr. A. Grahame Young in Kulu, one in Simla on 30th May by Colonel G. F. L. Marshall, three in Masuri at 7,000 feet, in June and July, 1868, by Colonel A. M. Lang, and twelve also in Masuri by Mr. P. W. Mackinnon in May and June, 1888-89. On the upperside they are almost exactly like females of *Z. syla*, Kollar; but agree in size and also in the character of the markings,

* Journ. A. S. B., vol. lv, pt. 2, p. 131 (1886).

with females of *Z. birupa*, Moore, differing in the colour of the ground of the underside, which is white, and in the lower portion of the submarginal band of the forewing being composed of two large quadrate black spots, the lower the larger. The sexes are alike, I can only discriminate between them by examining the primary sexual organs.

875. **Zephyrus pavo**, de N.

Z. pavo, de Nicéville, Proc. Zool. Soc. Lond., 1887, p. 460, pl. xl, fig. 11, *female*.

HABITAT: Bhutan; Margherita, Upper Assam.

EXPANSE: ♀, 1·35 inches.

DESCRIPTION: "FEMALE. UPPERSIDE, *both wings* black. *Forewing* with the costa somewhat widely, the apical third of the wing, and the outer margin at the anal angle black, the rest of the wing rich peacock-purple; a quadrate spot beyond the end of the cell, and an elongated one beyond and below it in the second median interspace, orange. *Cilia* black. *Hindwing* unmarked, the *tail* black tipped with white. *Cilia* white, tipped with black, except at the termination of the veins from the second median to the second subcostal nervule, where the cilia are entirely white. UNDERSIDE, *both wings* brownish-fuscous. *Forewing* with the disco-cellular nervules defined with a white line on each side; an obscure darker broad discal fascia from the costa to the first median nervule outwardly defined with a narrow white line, beyond which the wing is sprinkled with pale violet scales; another dark fascia from near the anal angle, decreasing in width from the inner margin to the third median nervule, where it becomes obliterated, also outwardly defined with a whitish line. *Hindwing* sprinkled almost throughout with pale violet scales; a broad irregularly wedge-shaped discal fascia, free of violet sprinkling, broad on the costa, narrowing to a bluntly rounded point above the anal angle, its margins defined with a fine violet-white line; another similar fascia beyond, inwardly defined with violet-white lunules; two subbasal ring-spots, one of which is within the discoidal cell, and a pair of lines on the abdominal margin, all violet-white; a submarginal oval black spot in the first median interspace, surrounded by a deep orange ring; a deep orange patch at the anal angle extending a short distance up the abdominal margin; a fine anteciliary dark line, inwardly defined by a white line."

"*Zephyrus pavo* is nearly allied to the *Z. katura* of Hewitson;* that species being probably the female of *Z. ataxus*, Doubleday and Hewitson, but differs on the upperside of the forewing in having the basal area of a richer shade of purple, of greater extent, and not divided by the black veins; on the underside the silvery bands in *Z. katura* are replaced in *Z. pavo* by violet irrorations; the two species also differ in other minor particulars."

"The type specimen is unique, and is deposited in Mr. A. V. Knyvett's collection, by whose native collectors it was obtained near Buxa in Bhutan." (*de Nicéville*, l. c.)

Mr. W. Doherty has recently taken a male specimen of this species near Margherita in Upper Assam, at 400 feet elevation only. It agrees closely with the type, but is a little larger. The specimen I described may also be a male; it is very singular however, that the male of *Z. pavo* should put on the pattern of markings and coloration of the females of several Indian species, though it is probably to be accounted for by the fact that they represent the primordial coloration of the group, and that the green colour of the upperside of the males of several species has been but lately acquired by that sex.

Genus 136.—EUASPA, Moore. (PLATE XXVII).

Euaspa, Moore, Journ. A. S. B., vol. liii, pt. 2, p. 29 (1884).

"FOREWING, short, broad; *costa* arched from the base; *exterior margin* erect, convex; *posterior* margin long, straight; *first subcostal nervule* emitted at two-sixths, and *second* at one-sixth before the end of the cell, second bifid at two-thirds from its base, *fourth* and *fifth* from the end of the cell; *disco-cellular* nervule very slender, erect, waved; *discoidal* nervule from its middle; *discoidal cell* broad, extending to half length of the wing; *second median nervule* from near the end of the cell, *first* median at one-third before the end; *submedian nervure* straight.

* *Dipsas katura*, Hewitson, Ill. Diurn. Lep., *Lycænidæ*, p. 65, n. 4, pl. xxvi, figs. 1, 2, *female* (1865).

HINDWING, short, very broad, *exterior margin* convex and slightly sinuous, with a single slender *tail* from the end of the first median nervule ; *costal* and *subcostal nervures* joined together at their base, the former much arched from the juncture ; *discoidal cell* broad, extending to half length of the wing ; *first subcostal nervule* emitted at one-fifth before the end of the cell ; *disco-cellular* nervule very slender, erect ; *discoidal* nervule from near its middle ; *second* and *third median* nervules from the end of the cell, *first* median at one-third before the end ; *submedian nervure* curved ; *internal* nervure short, recurved. BODY, short ; *palpi* porrect, second joint long, extending half beyond front of the head, pilose beneath, third joint slender, one-fifth as long as the second ; *legs* slender ; *antennæ* thickened at the end, tip blunt." *Eyes* finely hairy. (*Moore*, l. c.)

The above diagnosis appears to me to give a very erroneous account of the neuration of this genus, which is somewhat peculiar. The second subcostal nervule of the forewing most certainly is not bifid, if any it is the third ; nor do I understand how Mr. Moore makes the fourth and fifth subcostal nervules originate from the end of the cell. He only describes one disco-cellular nervule in each wing with the discoidal nervule from its middle, of course there are two, in the forewing the lower discoidal, in the hindwing the single discoidal nervule originate from their point of junction. In the hindwing there is nothing peculiar about the costal and subcostal nervures being joined together at their base, it is a common feature for these two veins to run side by side for some little distance from the base of the wing before they take different courses ; the disco-cellular nervules are not erect, but outwardly oblique. I should describe the neuration as follows :—In the forewing the costal nervure terminates opposite the apex of the discoidal cell ; the first subcostal nervule originates at about two-thirds of the length of the cell from the base ; the second subcostal originates half as near to the origin of the middle disco-cellular as to the base of the first subcostal ; the third subcostal is short, originates nearer to the apex of the wing than to the base of the upper discoidal ; the upper discoidal is given off from the subcostal nervure some little distance beyond the cell, which character is only found amongst Indian *Lycænidæ* in the genera *Gerydus*, *Paragerydus*, *Logania*, some species of *Poritia*, *Zephyrus* and *Liphyra* ; the middle disco-cellular nervule springs necessarily therefore from the subcostal nervure, is short, straight, upright ; the lower disco-cellular is about one-fourth longer than the middle disco-cellular, upright, concave ; the second median nervule given off a short distance before the lower end of the cell. In the hindwing the first subcostal nervule is given off quite close to the apex of the cell ; the disco-cellular nervules are outwardly oblique, concave, the upper slightly shorter than the lower ; the second median nervule given off exactly at the lower end of the cell. The male has no secondary sexual characters.

The genus *Euaspa* contains but a single species, which is strictly confined to the outer ranges of the Western Himalayas. In general appearance it is a "Blue" rather than a "Hair-streak," the apex of the forewing broadly black on the upperside, both wings with a broad discal white band, the rest of the wings blue. The underside is pale brown, the white discal band narrower, longer and very clearly defined, some white markings on the margin, the hindwing with a black spot in the first median interspace near the margin surrounded with a bright orange ring, with a streak of the same colour on the abdominal margin. The flight of *E. milionia*, Hewitson, is weak, and I have only found it amongst trees and bushes, upon which rather than on the ground it frequently settles. The sexes are alike.

876. **Euaspa milionia**, Hewitson. (PLATE XXVII, FIG. 203 ♀).

Myrina milionia, Hewitson, Ill. Diurn. Lep., Suppl., p. 5, n. 55, pl. iii, Suppl., figs. 79, 80, *male* (1869) ; *Hypolycæna milionia*, Moore, Proc. Zool. Soc. Lond., 1882, p. 249 ; *Euaspa milionia*, Moore, Journ. A. S. B., vol. liii, pt. 2, p. 29 (1884).

HABITAT : Simla (*Hewitson*) ; Kangra Valley, 9,000 feet ; Nepal (*Moore*).

EXPANSE : ♂, ♀, 1·3 to 1·5 inches.

DESCRIPTION : "MALE. UPPERSIDE, *both wings* cerulean blue. *Forewing* with a large medial white spot, the apical half dark brown. *Hindwing* with one tail, a large spot

of white at the costal margin, the apex and outer margin rufous-brown ; a submarginal line white. *Cilia* white. UNDERSIDE, *both wings* rufous-brown, crossed by a common band of white, with conical submarginal spots of white centred with brown. *Forewing* with three dark brown spots at the anal angle. *Hindwing* with the anal angle irrorated with white, and marked by three black spots surrounded with orange, the orange bordered above with black and blue." (*Hewitson*, l. c.) The FEMALE does not differ from the male except in its rather broader wings.

I met with this species in one spot at Kujiar, near Dalhousie, at the end of May, 1879. Mr. A. Grahame Young has sent many specimens from Kulu, as also has Mr. P. W. Mackinnon from Masuri. It appears to be single-brooded, occurring in May and June only. Mr. Moore records it from Nepal ; so far I have no certain knowledge of its occurring east of Masuri, neither Colonel Lang nor Mr. Doherty have met with it in Kumaon.

The figure shows both sides of a female specimen from Masuri in my collection.

Genus 137.—CHÆTOPROCTA, nov. (PLATE XXVII).

FOREWING, triangular ; *costa* regularly and evenly arched, *outer margin* slightly convex, *apex* slightly acute, *inner margin* straight ; *costal nervure* terminating opposite the end of the discoidal cell ; *first subcostal nervule* given off at about one-third before the end of the discoidal cell, *second* subcostal originating near the end of the cell, much nearer to the apex of the cell than to the base of the first subcostal, *third* subcostal originating from the subcostal nervure about midway between the end of the cell and the apex of the wing ; no *upper disco-cellular* nervule, *middle* disco-cellular concave, *lower* disco-cellular also concave, rather longer than the middle disco-cellular ; *lower discoidal* nervule from their point of junction, *upper* discoidal exactly from the apex of the cell ; *second median* nervule given off before the end of the cell ; *submedian nervure* straight. HINDWING, oval ; furnished with a short *tail* at the termination of the first median nervule ; a very small *anal lobe* ; *first subcostal* nervule originating a short distance before the apex of the cell ; *upper* and *lower disco-cellular* nervules in one straight line, in the male outwardly oblique, the lower not quite twice as long as the upper ; *second median* nervule given off a little before the apex of the cell. In the female the lower disco-cellular nervule of the hindwing is not quite so outwardly oblique as in the male, consequently the cell is shorter and blunter. *Antennæ* short, less than half the length of the costa of the forewing, with a well-formed long gradually-thickened club. *Palpi* short, porrect, not ascending above the lower edge of the eyes, second joint densely scaly, third joint naked. *Abdomen* in the female furnished with a very dense and large tuft of closely-packed pale ochreous-brown hairs.

Chætoprocta is nearest allied to *Zephyrus*, Dalman, from which in both sexes it may at once be known in that the upper discoidal nervule of the forewing has its origin from the subcostal nervure exactly at the apex of the discoidal cell, whereas in *Zephyrus* it springs from the subcostal some distance beyond the end of the cell ; in *Zephyrus* also the abdomen of the female is normal, whereas in *Chætoprocta* it is furnished with a dense velvety tuft of closely-packed hairs at its end, which is, as far as I know, a unique character amongst butterflies, though obtaining in many bombycid moths.

Chætoprocta contains but a single species, which might be called the "Indian purple hair-streak," being somewhat similarly marked to *Zephyrus quercus*, Linnæus. The upperside of both wings in both sexes is black, with a large discal and basal patch of shining purple. Underside greenish-white, with prominent discal bands, the disco-cellular nervules defined on both sides by a brown line, and some yellow markings towards the anal angle of the hindwing. The markings of the underside are almost precisely similar to those of *Zephyrus ziha*, Hewitson, a species in which the ground-colour is greyish-white, while in *C. odata* it is distinctly glossed with greenish. It occurs in the Western Himalayas, Kashmir, and adjoining territories wherever walnut trees grow, its larva feeding on that tree. I have described its transformations when describing the species.

877. **Chætoprocta odata,** Hewitson. (PLATE XXVII, FIG. 204 ♀).

Dipsas odata, Hewitson, Ill. Diurn. Lep., p. 66, n. 6, pl. xxx, figs. 13, 14, *male* (1865); id., Moore, Proc. Zool. Soc. Lond., 1865, p. 507, n. 113; idem, id., l. c., 1874, p. 272, n. 71.

HABITAT: Western Himalayas.

EXPANSE: ♂, ♀, 1·2 to 1·4 inches.

DESCRIPTION: "MALE. UPPERSIDE, *both wings* with the basal half violet-blue, the outer half dark brown, paler on the hindwing. *Cilia* white. UNDERSIDE, *both wings* grey-white. *Forewing* with a pale linear spot at the end of the cell, two small dark brown spots near the middle of the inner margin, a transverse rufous band beyond the middle, bordered on both sides with white, and a submarginal band of pale brown terminating near the anal angle in two large black spots. *Hindwing* with a spot at the end of the cell, a medial transverse rufous band and a submarginal brown band, both bordered with white; two lunular orange spots near the base of the tail, bordered above and below with black, the outer margin brown. FEMALE does not differ from the male, except that the whole of the *hindwing* is rufous-brown." (*Hewitson*, l. c.)

LARVA when full-grown about ·6 of an inch in length; onisciform, nearly cylindrical; coloration a pale rose pink, vinous, or pale yellowish-green; second segment anteriorly rounded, third, fourth, and fifth slightly progressively wider, thence slightly tapering to the anal segment, which is about subequal in width to the third and rounded posteriorly; the divisions between the segments fairly well marked; the entire upper surface widely pitted throughout, covered with minute tubercles bearing very short bristly hairs, the latter much longer on the lateral edge of the body; spiracles inconspicuous, concolorous; head small, entirely retracted beneath the second segment, anteriorly and laterally black, smooth, shining, posteriorly ochreous, the ochreous colour extending on to the middle of the head in a square figure, the entire head sparsely covered with rather long white hairs; the body is practically unmarked, there being only a slightly darker dorsal line; the under surface is pale green. Mr. Mackinnon describes the larva as possessing "a yellow dorsal stripe, wide on the second segment, narrower to sixth, from thence to anal segment narrow." Feeds on the walnut. PUPA of the usual lycænid shape, nearly cylindrical, head rounded, thorax very slightly humped and constricted posteriorly, abdomen ending in a blunt point; coloration dark reddish-brown, sparsely covered above with short hairs.

The above description has been drawn up from numerous specimens sent me in spirit, and a few alive, and a single live pupa, by Mr. P. W. Mackinnon of Masuri. He informs me that the larvæ are not attended by ants, though he has watched them carefully for many days, and this is probably correct, as I can find no trace with a strong magnifying glass of the special organs affected by ants, nor can I, by pressure, make the live larvæ extend those often found on the twelfth segment.

Mr. Wood-Mason has given me the following note on the clusters of eggs of this butterfly which have been sent me by Mr. P. W. Mackinnon from Masuri for examination:—" The abdomen bears at its extremity a huge smoothly convex semioval mass nearly as large as the thorax. This mass is made up of innumerable modified scales which are so arranged and so closely packed together that their united free ends form a smoothly rounded dead whity-brown solid-looking velvety surface. The scales are whity-brown in their apical half, black in their setiform basal half. A number of them is attached by the black end fanwise nearly all round the oral pole of each egg, so as to conceal all except a small (less than a fourth part) of it."

" The eggs are attached to the surface of the walnut twigs in elongated masses, consisting of five longitudinal rows, which appear to be covered with quincuncially-arranged imbricated scales throughout, except at one end, where a portion of one egg is left exposed. A study of an egg-mass shows that the first four or five eggs are laid in a line transverse to the long axis of the completed mass, and so that their fanned sides are turned away from, and their exposed sides turned towards, the end of the insect's body, then four or five more are added so that their fans cover the exposed portions of the first row, and so on till the mass is finished, the last egg of which is necessarily left partially exposed, for the eggs as they pass out of the oviduct are coated

with the secretion of the glue-glands and passing in this sticky state through, or rubbing against the hairy mass, simply agglutinate a layer of the highly deciduous fluffy material composing it to those parts of their periphery only that come into relation therewith, the insect apparently not interfering in the matter even so far as to cover the last egg, the exposed condition of which may even act advantageously by concentrating the attack of ichneumons, etc., on the one weak spot of the egg-armour."

"This species I have caught in Upper Kunawar, in July and August, frequenting the orchards of the charming villages of that fine country, at altitudes of 8,000 to 10,000 feet. They settle in great numbers on the walnut trees; sometimes on neighbouring apricots and poplars. As one strikes the boughs, troops of these little black-purple hair-streaks, with silvery-grey underside, flit about the thick foliage like a cloud of tortrices shaken out of an oak: they settle again at once. They fly about thus till very late." (*Note by Colonel A. M. Lang, R.E.*)

The female of *C. odata* has the purple coloration of the forewing much more restricted than in the male, and the hindwing often has a patch of purple colour in the middle. It does not occur further to the east, as far as I know, than Masuri, but it is common to the westwards, always near walnut trees. It is best obtained by beating the lower branches of those trees, or other trees in their neighbourhood, as it is rather a sluggish insect, and does not appear to fly much. Mr. Mackinnon informs me that the species is certainly single-brooded, the larvæ eating the young leaves only of the walnut. They do an immense amount of damage to the trees, and for the last two years Mr. Mackinnon has noticed that the first flush of leaves on about one hundred trees near his house in Masuri has been entirely eaten by them. The second flush of leaves which appears in May after the larvæ are full-fed and in the pupal or imaginal state are never eaten. He says also that the imagines are extremely active in the evening, though quiescent during the day. They are very difficult to catch in really perfect condition; they seem to become worn very quickly after emergence.

The figure shews both sides of a female example from Masuri in my collection.

Genus 138.—CHRYSOPHANUS, Hübner. (PLATE XXVII).

Chrysophanus, Hübner, Verz. bek. Schmett., p. 72 (1816); id., Westwood, Gen. Diurn. Lep., vol. ii, p. 497 (1852); id., Trimen, Rhop. Af. Aus., p. 258 (1862-66); idem., id., South-Af. Butt., vol. ii, p. 90 (1887); *Lycæna*, sect. 3 (part), Fabricius, Ill. Mag., vol. vi, p. 285, n. 32 (1807); id., Kirby, Syn. Cat. Diurn. Lep., p. 340 (1871); *Cupido*, sect. A, Schrank, Fauna Boica, vol. ii, pt. 1, pp. 153, 206 (1801); *Polyommatus* (part), Latreille, Hist. Nat. Crust. et Ins., vol. xiv, p. 116 (1805); idem., id., Enc. Méth., vol. ix, p. 11 (1819); id., Boisduval and Leconte, Lep. Amer. Sept., p. 122 (1833); id., Boisduval, Gen. et Ind. Meth., p. 9 (1840); id., Lang, Butt. of Eur., p. 86 (1884); *Heodes* (part), Dalman, Kongl. Vetensk. Acad. Hand., vol. xxxvii, pp. 63, 91 (1816).

"General characters of *Lycæna*, Fabricius, but with the *eyes* naked, and the upperside of the wings generally copper-coloured. HEAD, small, hairy; *palpi* obliquely porrected, of moderate length, the basal and middle joints thickly clothed with bristly hairs, terminal joint slender, elongate, nearly naked, of nearly equal length in both sexes; *antennæ* of moderate length, slender, middle joints long, ringed with white, terminated by a distinct elongate-ovate club, not or scarcely spoon-shaped. FOREWING, somewhat elongated, and more acute at the tip than in *Lycæna*, with the veins and their branches arranged as in that genus, the position of the slender disco-cellular nervules closing the discoidal cell indicated by a transverse black spot on the underside, which is also generally much ocellated. HINDWING, ovate, with the anal angle more prominent than in *Lycæna*, the extremity of the first median nervule is also often produced into a slight angle, especially in the males, marked beneath with black spots similar to those of the forewing. FORELEGS, nearly alike in size in both sexes, scaly; *tibiæ* armed with numerous short acute spines, set on irregularly, the tip not produced into a hook; *tarsi* on the underside also armed with still more numerous spines, those of the male exarticulate, and terminating in an obliquely curved horny point, those of the female articulated, the first joint about equal in length to all the others united, and rather swollen, terminal joint armed with acute claws, rather dilated and angulated near the base.

Pseudonychia moderate-sized, strongly bifid, the divisions conical, finely setose. *Pulvillus* large. MIDDLE and HINDLEGS, rather short, *tarsi* with the basal joint long, and often swollen in the males, claws and their appendages formed as in the forelegs."

"LARVA, elongate-ovate, swollen, onisciform, generally finely hairy, head small; feeding upon docks, grasses [?], and low herbage. PUPA, short, thick, and entire, with the head-case obtuse."

"This group is unquestionably very closely allied to *Lycæna*; but the splendid coppery colours of the upper surface of the wings, the naked eyes, and the very spinose feet, seem to warrant their generic separation. *C. phlæas*, Linnæus, is remarkable for the dilated basal joint of the four hind tarsi of the male." (*Westwood*, l. c.)

Chrysophanus may be known from *Lycæna* as restricted in this work by the upper discoidal and middle disco-cellular nervules of the forewing having a common origin, *i.e.*, spring from the same point, this latter nervule in *Lycæna* arising from the upper discoidal some little distance from the base of the latter. I know of no character by which *Chrysophanus* can be separated structurally from *Ilerda*, Doubleday. As a rule. the species comprised in it are of a brilliant coppery colour on the upperside, but this coloration is often reversed in the sexes, being in *C. phlæas* brightest in the female, in *C. pavana* brightest in the male; in the species given in this work it is most brilliant in *C. aditya*, Moore, least so in *C. kasyapa*, Moore, except in the very aberrant *C. caspius*, Lederer, var. *transiens*, Staudinger, in which there is no copper colour on the upperside of either sex. The outline of the wings also is very variable. *C. phlæas* has a distinct tooth (more prominent in the male) at the termination of the first median nervule of the hindwing, and the anal angle also produced; these characters are less noticable in *C. pavana*; *C. aditya* and *C. kasyapa* have the hindwing evenly rounded; whilst the aberrant *C. caspius*, var. *transiens* has a distinct long narrow tail. The latter species in both sexes has the basal area of both wings glossed with purple, and in every way looks more like a "blue" than a "copper" on the upperside. The markings and coloration of the underside are so various in the Indian species of the genus that there can be no difficulty whatever in distinguishing any of them at a glance. The genus has an immense range, and inhabits every great geographical division of the earth. Mr. W. H. Edwards gives seventeen species as inhabiting North America north of Mexico,* one inhabits Chili in South America, Dr. Lang gives twelve species and many varieties as inhabiting Europe, several species occur in North Africa, one in Abyssinia in East Africa, one each in Tropical and extreme South Africa, numerous species inhahit the Palæarctic regions of Asia, but none in the Indo-Malayan region, as far as I know; one species has been recorded from Queensland in Australia, and four from New Zealand. *C. phlæas* is one of the widest-ranging of butterflies, as it occurs under various forms in Japan, China, and thence across Asia through Europe to North America, and is the commonest Indian species of the genus.

Key to the Indian species of Chrysophanus.

A. Both sexes more or less copper-coloured or orange on upperside; no distinct long narrow tail to hindwing.
- *a*. Anal angle and termination of first median nervule of hindwing produced into a tooth.
  - *a*¹. Underside, hindwing without a white outer-discal band.
    - 878. C. PHLÆAS, Western Himalayas, Biluchistan.
  - *b*¹. Underside, hindwing with a prominent white outer-discal band.
    - 879. C. PAVANA, Western Himalayas, Kashmir.
- *b*. Hindwing evenly rounded.
  - *a*¹. Underside, hindwing dull greyish-white.
    - 880. C. ADITYA, Ladak, Baltistan.
  - *b*¹. Underside, hindwing metallic greenish-blue.
    - 881. C. KASYAPA, Western Himalayas, Kashmir.

B. Both sexes without copper coloration on upperside, basal half of the wings glossed with purple; a distinct long narrow tail to hindwing at termination of first median nervule.
- 882. C. CASPIUS, var. TRANSIENS, Persia, Afghanistan.

* Butterflies of North America, vol. i, Synopsis of N. A. Butterflies, p. 32 (1873).

878. **Chrysophanus phlæas**, Linnæus. (PLATE XXVII, FIG. 205 ♂).

Papilio phlæas, Linnæus, Faun. Suec., p. 285, n. 1078 (1761); idem, id., Syst. Nat., ed. xii, vol. 1, pt. 2, p. 793, n. 252 (1767); id., Esper, Schmett., vol. i, pt. 1, pl. xxii, fig. 1 (1777); id., Hübner, Eur. Schmett., vol. i, figs. 362, 363 (1805-1824); *Polyommatus phlæas*, Godart, Enc. Méth., vol. ix, p. 670, n. 167 (1823); id., Elwes, Proc. Zool. Soc. Lond., 1881, p. 887; id., Leech, Proc. Zool. Soc. Lond., 1887, p. 414, n. 51; id., Pryer, Rhop. Nihonica, p. 16, n. 49, pl. iv, fig. 21, *female* (1888); *Chrysophanus phlæas*, Westwood, Gen. Diurn. Lep., vol. ii, p. 498, n. 4 (1852); id., Horsfield and Moore, Cat. Lep. Mus. E. I. C., vol. i, p. 27, n. 28 (1857); id., Swinhoe, Trans. Ent. Soc. Lond., 1885, p. 340, n. 14; *Polyommatus phlæas*, Kollar, Hügel's Kaschmir, vol. iv, pt. 2, p. 417, n. 4 (1848); *Chrysophanus phlæas*, Moore, Proc. Zool. Soc. Lond., 1874, p. 271, n. 61; idem, id., l. c., 1882, p. 247; *Papilio virgaureæ*, Scopoli, Ent. Carn., p. 180, n. 462 (1763); id., Fourcroy, Ent. Paris, vol. ii, p. 246, n. 35 (1785); *Papilio timeus*, Cramer, Pap. Ex., vol. ii, p. 137, pl. clxxxvi, figs. E, F, *female* (1777); *Chrysophanus timeus*, Moore, Proc. Zool. Soc. Lond., 1865, p. 506, n. 109; id., Butler, l. c., 1886, p. 368, n. 52; *C. timæus*, Doherty, Journ. A. S. B., vol. lv, pt. 2, p. 130, n. 149 (1886); *C. stygianus*, Butler, Proc. Zool. Soc. Lond., 1880, p. 408, n. 14, pl. xxxix, fig. 5, *male*; *C. phlæas*, var. *stygianus*, id., Ann. and Mag. of Nat. Hist., fifth series, vol. ix, p. 208 (1882); *C. baralacha*, Moore, Journ. A. S. B., vol. liii, pt. 2, p. 25 (1884).*

HABITAT: Palæarctic and Nearctic regions; in India, Biluchistan, and the Western Himalayas at suitable elevations.

EXPANSE: ♂, ♀, 1·2 to 1·6 inches (Indian specimens).

DESCRIPTION: Typical race, *C. phlæas*, Linnæus. EXPANSE: ♂, ♀, 1·2 to 1·4 inches. MALE. UPPERSIDE, *forewing* dark shining copper overlaid with blackish scales; with a somewhat broad even black band on the outer margin; a small black spot near the base of the discoidal cell, a quadrate one in the middle, and an oblong one at its end; a discal series of seven rounded spots placed in echelon, the three upper ones from the subcostal nervure to the third median nervule, the next two in the median interspaces, the last two (usually more or less conjoined) in the submedian interspace. *Hindwing* blackish; the disco-cellular nervules marked with a linear deep black spot; a broad coppery submarginal band from the anal angle to the middle of the second subcostal interspace, inwardly marked with a series of cordiform black spots placed against the band, sometimes with a discal series of blue irrorated spots, generally four in number; the outer edge of the orange band deeply scalloped. UNDERSIDE, *forewing* bright ochreous, the apex broadly, outer and inner margins less broadly, brownish-grey; the black spots as above, but surrounded by a pale ochreous line; the inner edge posteriorly of the outer marginal band with three increasing black spots placed against it. *Hindwing* brownish-grey, with a few indistinct darker spots scattered evenly over the surface; with the coppery band of the upperside but much narrower and obscure. *Cilia* cinereous on the upperside, brownish-grey on the underside. FEMALE. UPPERSIDE, *forewing* with the copper coloration brighter and clearer than in the male, the black spots smaller and better defined. *Hindwing* with the coppery band broader. UNDERSIDE, *forewing* with four instead of three black spots placed against the outer brownish-grey marginal band. *Hindwing* like the male.

This description has been taken from typical Prussian specimens. As far as I am aware, the typical form occurs in Europe and North-Western Asia only, where however it has several local forms or races which have received distinctive names. It is the common "Small Copper" of Great Britain.

LARVA. "The colour of the head dingy green, with a few dark brown markings; of the body, opaque apple-green, the warts being white, and the bristles sienna-brown; in some specimens the green is interrupted by three stripes of a delicate purplish-pink, one of them medio-dorsal, the others marginal." This description has been drawn up by the late Mr. E. Newman, and quoted by Dr. Lang in Butt. of Europe, p. 96, pl. xxviii, figs. 3. larvæ and pupa. He states that it "feeds on various species of *Rumex*" (sorrels and docks). PUPA. "Dirty white, speckled with black or dark brown." (*Lang*, l. c.)

Local race, *C. timeus*, Cramer. EXPANSE: ♂, ♀, 1·3 to 1·7 inches. DESCRIPTION: MALE. Larger than the typical form. UPPERSIDE, *forewing* very much darker, the coppery colour almost

* The above does not give the entire synonomy of this species. I have omitted all references to the North American forms, and also to the varieties *a* to *f* given in Mr. Kirby's Syn. Cat. Diurn. Lep., pp. 343, 344.

entirely overlaid with blackish ; the black spots larger. Otherwise as in the typical form. FEMALE. Larger. UPPERSIDE, *forewing* with the lower basal area thickly overlaid with blackish scales, having the apical and outer portions alonc of thc coppery ground-colour quite clear. *Hindwing* with the discal blue spots often very large and prominent. Otherwise as in the typical form.

Regarding this form Colonel Lang notes as follows :—"This species has a wide distribution in the N.-W. Himalayas ; common in the outward ranges, Kasauli, &c. ; appearing here and there, up to Upper Kunawar, in very various climates. It, however, disappears in certain gaps, as it were, which are occupied by *C. pavana*," Kollar. Mr. Butler notes :—"Major Yerbury says that the species is 'common at Murree and along the hills to Thundiani in August and September.' *C. timeus* has been identified for him as *C. phlæas* ; it appears, however, to be a tolerably constant form, so far as I can judge from our present series ; on the upperside it much resembles *C. stygianus*, Butler, of Kandahar, but the darker colour and red band on the underside of the hindwing at once separate it." Mr. Butler records *C. timeus* from Kandahar also. Colonel Lang reports it to be "common at Naini Tal at 5,500 to 7,000 feet ;" and Mr. Doherty remarks on Kumaon specimens :—"Comparing the prehensores of my specimens [of *C. timæus* (*timeus*), Cramer] with those figured by Dr. White, I should suppose the species distinct from the European *C. phlæas* (*phlæax* ?), Linnæus." He says he met with it at "Naini Tal, 6-7,000 feet, above Garbyan, and at Kalapani, N.-E. Kumaon, 11-15,000 feet."

This form was described by Cramer from Smyrna in Asia Minor ; there are numerous specimens of it from Persia in the Indian Museum, Calcutta ; and it occurs from Kashmir to Naini Tal at any rate at suitable elevations on the outer ranges of the Himalayas. Mr. Moore has recorded it from Darjiling, but this is incorrect, though it may possibly occur on the inner ranges of Sikkim at a suitable elevation. Mr. Moore also states that it occurs in Bhutan, but I have seen no specimen of the genus taken further east than Naini Tal.

Local race, *C. stygianus*, Butler. EXPANSE : ♂, 1·33 ; ♀, 1·42 inches. DESCRIPTION : "MALE. UPPERSIDE, *both wings* smoky brown. *Forewing* in certain lights shot with fiery copper ; spotted with black as in *C. timeus*, Cramer (*eleus ?* Fabricius) ; two small orange spots beyond the interrupted black discal series. *Hindwing* with a slender undulated deep reddish-orange band on a black ground near the outer margin ; above it a series of four or five pale blue hastate spots, and above these again beyond the end of the cell two black dots ; a black dash at the end of the cell. *Cilia* greyish-white. *Body* blackish. UNDERSIDE. *both wings* very like *C. timeus*, but considerably paler. *Forewing* with the submarginal black spots less distinctly white-bordered ; the apex and outer margin very pale grey. *Hindwing* with the ground-colour very pale grey. FEMALE. Larger than the male. UPPERSIDE, *forewing* with the outer third of the cell and the subapical area bright orange, the black spots larger, otherwise similar. UNDERSIDE, *both wings* slightly yellower in tint all over, so that the ground tint of the *hindwing* has a pale brownish rather than greyish hue."

"This species is comparatively larger than *C. phlœas* [= *phlæas*, Linnæus], and has the costal margin of the forewing longer." (*Butler*, l. c. in Proc. Zool. Soc. Lond., 1880). "An examination of the forty-one examples of this species obtained at Kandahar in October, and submitted to me for examination, has shown that the form named by me *C. stygianus* cannot be specifically separated from *C. phlæas*." (*Butler*, l. c. in Ann. and Mag. of Nat. Hist.) Colonel Swinhoe writes of it :—"Quetta, September ; Kandahar, October to January. Very common. With a long series such as I have, containing the typical forms of *C. phlæas*, Linnæus, *C. timeus*, Cramer, and *C. stygianus*, Butler, it is absolutely impossible to separate them."

In the Indian Museum, Calcutta, are a pair of this species which have been named *C. stygianus*, Butler, by Mr. Moore, which were taken by me at Darcha in Lahoul in July, 1879. Major Howland Roberts found it common at Kandahar in April and May, abundant in June. In my collection are many specimens of both sexes from Quetta (September), and Kandahar (October and November) taken by Colonel Swinhoe ; from Bushire in Persia

taken in April; from Astor, 7,700 feet, taken in September by Colonel Biddulph; and from Pangi taken by Mr. Ellis in October; all these examples are larger than typical *C. phlœas*, the male on the upperside of the forewing darker, and the underside of both wings paler. They are smaller than the local form *timeus*, the male on the upperside of the forewing brighter, in the female bright orange rather than coppery. If the local races of *C. phlœas* are to be discriminated by a separate name, *C. stygianus* appears to me to deserve to be so separated as much as *C. timeus* or *C. baralacha*, though the describer himself has failed to find characters of sufficient specific value to enable him to keep it distinct from *C. phlœas*.

Local race, *C. baralacha*, Moore. EXPANSE: ♀, 1·37 [1·5] inches. DESCRIPTION: "FEMALE. Differs from specimens of the same sex of *C. phlœas*, Linnæus (var. *stygianus*, Butler), taken in the neighbouring country of Lahoul. UPPERSIDE, *forewing* golden-yellow, with a blackish quadrate spot in the middle of the cell, a larger spot at its end, three oblique subapical spots, and three lower discal spots, the lowest spot being the longest and curved; from the three subapical spots some black speckles proceed to the disco-cellular spot; the costal edge is very narrowly bordered with brown, and the exterior margin has a narrow macular brown border of half the width of that of the above-mentioned species. *Hindwing* golden greyish-brown, with a broad pale red outer marginal band, which is very slightly indented with black at the end of the veins on its outer border, and on the inner border by a row of indistinct blackish spots surmounted by blue-grey scales, above which is a discal row of five or six smaller black spots and also a black lunule at the end of the cell. UNDERSIDE, *both wings* of similar colour to that of the above species. *Forewing* with the spots as on the upperside, but pale-bordered, also a spot at the base of the cell, two small spots on the costa above the discal series, and three linear spots on the exterior margin above the angle, these latter spots being nearer the margin. *Hindwing* with less defined red-streaked marginal band, the discal and other spots also comparatively larger."

"Baralacha Pass, 16,060 feet, Ladak. Taken in July, 1879, by Mr. L. de Nicéville." (*Moore*, l. c.)

The type and only known specimen of this local race is in the Indian Museum, Calcutta. It is of large size (true expanse 1·5 inches, *i.e.*, when measured from apex of forewing to centre of thorax and then doubling the amount, this being the mode by which I take the expanse of all insects described by me), coloration a little paler than in the same sex of *C. stygianus*, the black spots on the upperside of the forewing larger, and the costal and outer borders narrower.

To sum up *C. phlœas*. There is no doubt that the local races of this species are the immediate effect of the different climates in which they live, the darkest form, *C. timeus*, occurs where the rainfall is heaviest and the vegetation consequently most luxuriant, *C. stygianus* and *C. baralacha* inhabiting far more barren and rainless regions. It is also certain that an absolutely complete gradation of forms between all the Indian races at any rate could be shewn were sufficient material available, but that does not prevent the local races being distinct and capable of discrimination at their respective head quarters. Mr. Pryer (l. c.) makes some excellent remarks on the seasonal variability of this species in Japan.

The figure shews both sides of a male specimen of the local race *timeus* from Masuri in the collection of the Indian Museum, Calcutta.

879. **Chrysophanus pavana**, Kollar.

Polyommatus pavana, Kollar, Hügel's Kaschmir, vol. iv, pt. 2, p. 416, n. 2, pl. v, figs. 5, 6, *male* (1848); *Chrysophanus pavana*, Horsfield and Moore, Cat. Lep. Mus. E. I. C., vol. i, p. 28, n. 29 (1857); id., Moore, Proc. Zool. Soc Lond., 1865, p. 506, n. 110; idem, id., l. c., 1874, p. 271, n. 62; idem, id., l. c., 1882, p. 247; *Thecla panava*, Westwood, Gen Diurn. Lep., vol. ii, p. 487, n. 143 (1852).

HABITAT: Western Himalayas.

EXPANSE: ♂, ♀, 1·3 to 1·5 inches.

DESCRIPTION: "Wings entire, forewing of the male fulvous, bordered with fuscous, hindwing and of the female both wings fuscous on upperside, forewing with nine black dots, hindwing with a marginal dentate fulvous fascia: underside, forewing yellowish, hindwing cinereous, with numerous black ocellate dots, the fulvous fascia of the hindwing margined with yellow on both sides." (*Kollar*, l. c.)

MALE. UPPERSIDE, *forewing* rich copper red, the costa narrowly, the outer margin broadly black, the black colour extending up the veins a short distance; on either side of the submedian nervure powdered with fuscous scales; three black regularly-increasing spots in the discoidal cell, the basal one often obsolete; a discal series of seven spots placed in echelon, three towards the apex, two divided by the second median nervule, and two in the submedian interspace conjoined. *Hindwing* coppery, but thickly overlaid with black scales except a small portion in the middle of the disc; a linear black spot at the end of the cell, two similar spots beyond it divided by the discoidal nervule; a strongly lunular or arch-formed submarginal copper-coloured band. *Cilia* of the forewing white, of the hindwing white marked with black at the end of the veins. UNDERSIDE, *forewing* bright orange, the outer margin cinereous, bearing an outer series of black dots and an inner series of prominent black spots; other black spots as on the upperside but encircled by a fine pale yellow line, an additional dot to the subapical series. *Hindwing* brownish-grey, with prominent black spots surrounded by a narrow whitish ring, three towards the base, three on the disc, two at the end of the cell, and nine beyond in an irregular linear series; beyond these latter is a prominent white band, then a series of black spots divided on the veins by the white colour of the band, then a series of orange lunular spots, with a round black spot on a band of the ground-colour placed outwardly against them, and lastly a fine anteciliary white line. *Cilia* of both wings pale fuscous, more or less tipped with white on the hindwing. FEMALE. UPPERSIDE, *forewing* differs from the male in the outer black border being broader, its inner edge more irregular, the black colour not extending along the veins, the base and lower inner half of the disc black, but divided by the orange-coloured veins, and a narrow streak in the submedian interspace; all the black spots much larger. *Hindwing* like the male, but with no trace of copper colour on the disc, sometimes with a series of violet lunules placed close to the inner edge of the submarginal orange lunulated band, which in the male is represented by a purple suffusion in some specimens. UNDERSIDE, *both wings* like the male.

C. pavana is a fairly common species occurring throughout the summer on the outer ranges of the Western Himalayas from Kashmir to Naini Tal at any rate. Mr. Doherty reports it from "Kumaon generally 4,500-13,000 feet, local," and Colonel Lang "Naini Tal and Almorah 6,000 to 7,000 feet, June to August." The prominent white band on the underside of the hindwing will distinguish this species from any other "Copper" known to me.

880. **Chrysophanus aditya**, Moore.

C. aditya, Moore, Proc. Zool. Soc. Lond., 1874, p. 571, pl. lxvi, fig. 1, *male*.

HABITAT: Dras valley (between Tashgam and Korkitchoor), Ladak (*Moore*); Baltistan.

EXPANSE: ♂, 1·37 inches (1·65, actual measurement of figure).

DESCRIPTION: "Allied to *C. hippothoë*, Linnæus, [which occurs in Northern and Central Europe and in Siberia]. MALE. UPPERSIDE, *both wings* brilliant metallic brassy copper-red. *Cilia* black, edged with white. *Forewing* with a narrow jet-black costal edge and outer marginal band, the band expanded at the apex and maculate between the veins. *Hindwing* with a marginal jet-black line and prominent conical spots; abdominal margin greyish. UNDERSIDE, *forewing* pale golden-yellow, brightest on the disc; two pale-bordered black spots within and a larger spot crossing the end of the cell; [three decreasing spots on the disc,] a curved series of four black spots from the costa before the apex, a submarginal series of black dentate lunules, and a marginal row of small black spots. *Hindwing* dull greyish-white; two black spots above, two below, two within, and a geminated spot at the end of the cell; a transverse interrupted

discal series of nine black spots, a submarginal row of black dentate lunules bordered outwardly with golden-yellow, and a marginal row of small spots." (*Moore*, l. c.)

C. aditya is very close indeed to the "*Polyommatus*" *solskyi* of Erschoff,* from Maracanda in Turkestan, described in the same year. It differs however in its larger size (1·65 as against 1·45 inches, taken from the figures). the marginal black band on the upperside of the forewing in *C. aditya* is narrower, especially at the apex; on the hindwing also narrower and separated into distinct spots between the veins; the markings of the underside are very similar. It is probably this species that Mr. Leech and I took (four males and one female) on 29th and 30th July, 1887, near Braldo in Baltistan, at 11,700 feet elevation, also three males and a female on August 10th and 11th on the first two marches out of Skardo towards the Deosai Plains, but I have not the specimens now with me to determine. Whether distinct or not from *C. solskyi*, it is totally different from any of the other Indian representatives of the genus by reason of the brilliant golden brassy colour of the upperside.

881. **Chrysophanus kasyapa**, Moore.

C. kasyapa, Moore, Proc. Zool. Soc. Lond., 1865, p. 506, n. 111, pl. xxxi, fig. 10, *male*; id., Staudinger, Ex. Schmett., p. 270, pl. xciv, *male* (1888); *C. zariaspa*, Moore, Proc. Zool. Soc. Lond., 1874, p. 271, n. 64.

HABITAT: Western Himalayas.

EXPANSE: ♂, 1·12 to 1·60; ♀, 1·30 to 1·60 inches.

DESCRIPTION: "MALE. UPPERSIDE, *both wings* bright coppery red, with purple reflexions. *Forewing* with the extreme edge of the costa and the exterior margin black, the latter submarginally bordered with purple; a black spot within the discoidal cell, a second transversely closing the cell, four near the apex obliquely from the costa, and four others descending the disc. *Hindwing* with the anterior and exterior margins black, bordered submarginally with purple, which latter colour also borders the anal margin; a minute dot within the discoidal cell, a narrow streak closing the cell, and a series of five discal spots black. *Body* black. UNDERSIDE, *both wings* metallic greyish-blue, with greenish reflexion at the base of the hindwing. *Forewing* with the black spots as above, also a short black submarginal streak from the posterior angle, between which and the discal spots the space is ferruginous. *Hindwing* with a discal series of minute black dots. *Body* and *legs* white. *Cilia* white." (*Moore*, l. c.) FEMALE. UPPERSIDE, *forewing* orange, very variable, in some specimens (one from Chini in particular) clear bright orange, usually very dusky; the outer margin broadly black, the base also black more or less diffused over the disc; the spots as in the male but larger. *Hindwing* dusky black, sometimes with the veins orange; the black spots of the underside more or less showing through, sometimes with a submarginal series of beautiful violet spots, beyond which there is sometimes a narrow marginal orange line. UNDERSIDE, *forewing* with the apex and outer margin only metallic greenish-blue, the base just dusted with this colour, the rest of the wing bright clear orange; the black spots as on the upperside, a submarginal series of three or four black spots towards the anal angle placed against the green marginal band. *Hindwing* as in the male.

"Very uncommon. It occurs in June, in richly wooded country, in Lower Kunawar, 7,000 to 8,000 feet altitude. The female is much darker brown." (*Note by Colonel A. M. Lang, R. E.*). I have taken it in the summer in many places in Kashmir, usually from about 7,000 to 10,000 feet elevation. It occurs also in Chumba, Lahoul, Chini, and on the Hindustan and Thibet Road near Simla. It does not appear to occur as far west even as Masuri, and is really confined to a comparatively small area. It is one of the most beautiful of the "Coppers" and has no near ally to my knowledge, unless the *C. zariaspa* of Moore described below† should hereafter be found to be distinct.

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* Lep. Turkestan, p. 8, n. 20, pl. i, fig. 7, *male* (1874).

† *Chrysophanus zariaspa*, Moore, Proc. Zool. Soc. Lond., 1874, p. 271, n. 64. HABITAT: Sonamurg, N.-E. Kashmir. EXPANSE: *Male*, 1·12 inches. DESCRIPTION: "MALE Allied to *C. kasyapa*, Moore, but is a smaller insect, and differs on the UPPERSIDE in having the black spots smaller and the marginal borders

The next species belongs to a very aberrant group, which is distinguished by possessing a long filamentous tail to the hindwing. The Rev. R. P. Murray in discussing the importance of tails in the *Lycænidæ* for generic purposes, makes the following remarks regarding this tailed group of "Coppers":— "The tailed hindwings appear at first sight of more importance [than the presence of one or two metallic spots at the anal angle of the hindwing on the underside sometimes considered to afford a generic character], being certainly, to some extent, a structural character; but a careful consideration of many interesting species, both in *Lycæna* and the allied genus *Chrysophanus*, has forced me, somewhat reluctantly, to the conclusion that this, too, must be abandoned as a generic character. In *Chrysophanus* the hindwing ordinarily presents a more or less marked projection on the first median nervule, which, however, cannot be designated a *tail*. In *C. orus*, Cramer, from South Africa, this projection is wanting, so that the outline of the hindwing is rounded. On the other hand, we are unexpectedly met, in Persia, by a group of species, which are undoubtedly true *Chrysophani*, but which possess a tail, at least as well developed as in any known species belonging to the so-called genus *Lampides*, Hübner. These species are named *C. lampon*, Lederer, *C. phœnicurus*, Lederer, and *C. caspius*, Lederer. The last two are very distinct species, to which it is unnecessary to refer further. But *C. lampon* is so closely allied to *C. ochimus*, Herrich-Schäffer, that it can with difficulty be distinguished from it, except by the possession of a long filiform tail. This curious tendency to produce tailed forms seems confined to Persia, so far as the genus *Chrysophanus* is concerned (the Persian *Lycænæ* do not share the character), since none either of the European or Himalayan species present the character, and the only new *Chrysophanus* discovered by M. Fedtchenko in Eastern Turkestan (*C. solskyi*, Erschoff) is equally destitute of a tail." (Trans. Ent. Soc. Lond., 1874, p. 528.)

882. **Chrysophanus caspius**, Lederer, var. **transiens**, Staudinger. (PLATE XXVII, FIG. 206 ♂).

Polyommatus caspius, Lederer, Hor. Soc. Ent. Ross., vol. vi, p. 76, pl. iv, fig. 3, *male* (1869); *P. caspius*, var. *transiens*, Staudinger, Stett. Ent. Zeit., 1886, p. 201; *Chrysophanus susanus*, Swinhoe, MS.

HABITAT: (var. *transiens* only) Samarkand; Gunduk, Quetta, Biluchistan.

EXPANSE: ♂, ♀, 1·0 to 1·1 inches.

DESCRIPTION: MALE, UPPERSIDE, *both wings* purplish-brown; a fine anteciliary black line. *Forewing* with the basal two-thirds glossed with dull purple, the spots of the underside more or less showing through by transparency. *Hindwing* with a large patch of glossy dull purple in the middle of the wing, the disco-cellular nervules marked with a black line, a submarginal series of round black spots, beyond which is a narrow white line towards the anal angle, *tail* black tipped with white. UNDERSIDE, *both wings* sordid white, a prominent fine black anteciliary line. *Forewing* with a round spot towards the base of the cell, with a similar one immediately below it, a larger oval spot across the middle of the cell, with a round spot just below it, a large quadrate spot closing the cell, with three unequal-sized spots below it divided by the median nervules, the middle one the largest; an S-shaped subapical series of four conjoined spots, the two upper ones small; a submarginal regularly-curved somewhat narrow macular fascia, placed outwardly against it is an orange increasing band, a marginal series of round spots between the veins—all the spots and the submarginal fascia black. *Hindwing*

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broader, the latter being suffused inwardly with purplish-blue, this colour in certain lights pervading the entire wings. On the *hindwing* the spots are preceded by bluish black streaks pointing inwards. On the UNDERSIDE the spots are also smaller, and the coppery red bordering the three spots at the posterior angle is much brighter.' (*Moore*, l. c.)

In the Indian Museum, Calcutta, is a single male of this species so identified by Mr Moore, which I took in the Sind Valley, Kashmir, at the end of June. It certainly has the outer margin of the forewing on the upperside more broadly black than is usual in *C. kasyapa*, and the black spots in the median interspaces are very small, in *C. kasyapa* they are usually elongated into streaks completely filling the base of the interspaces. Mr. Moore describes *C. zariaspa* as having the marginal border "suffused inwardly with purplish blue," which character he gives in other words for *C. kasyapa*, "the exterior margin black, submarginally bordered with purple." All the characters Mr. Moore gives are evidently so slight, and, from my series of nearly forty male specimens, so variable, that I feel sure that *C. zariaspa* cannot be considered to be even a local form of *C. kasyapa*.

with a regular subbasal series of four spots, the posterior but one the smallest, a similar inner discal series, but the spots much larger, an oblong spot closing the cell, an outer discal series of six spots placed in pairs, but with a minute dot in the second median interspace added anteriorly to the posterior pair—all these spots black; the rest of the markings much as in the forewing, but the orange band is narrower. *Cilia* white throughout. *Body* concolorous with wings above and below. FEMALE. UPPERSIDE, *both wings* with the dull glossy purple area not sharply defined as in the male. *Forewing* with a prominent black spot in the middle and another at the end of the cell. *Hindwing* with the disco-cellular nervules marked with a black line, an obscure orange marginal fascia towards the anal angle. UNDERSIDE, *forewing* very differently marked and coloured to that of the male; the base and outer margin only sordid white, the disc bright orange, the submarginal orange band of the male consequently absorbed in the ground-colour; all the spots much smaller, less numerous and differently arranged to those of the male; the three spots in the cell as in the male but smaller, a single very small spot only below the cell just below the point where the first median nervule originates; a nearly regular discal series of from six to eight spots, the uppermost on the costa sometimes absent, and the one in the submedian interspace sometimes divided into two; a double submarginal series of black spots, the inner series large and oblong, the outer series small and linear. *Hindwing* marked as in the male, but the spots a little smaller.

C. caspius, var. *transiens* is nearest to *C. phœnicurus*, Lederer,* from Astrabad in Persia, and from Kouldja in western China,† the male differing on the upperside of the hindwing in having but the barest trace of a submarginal orange fascia, and on the underside in having all the spots much larger, more numerous, and differently arranged; in *C. caspius*, var. *transiens*, the spots form a series of four transverse equi-distant bands, and, judging from the figure alone of *C. phœnicurus*, the submarginal black fascia in *C. caspius*, var. *transiens* is further from the outer margin, and the orange band beyond it is broader. The female differs on the upperside of the hindwing in having an obsolete submarginal orange band towards the anal angle only, in *C. phœnicurus* it is a broad prominent lunular band enclosing rounded spots of the ground-colour and extending almost to the apex of the wing. The underside of the forewing is quite different in the two species, being alike in both sexes of *C. phœnicurus*, and different in the opposite sexes of *C. caspius*, var. *transiens*. It is also less near to *C. caspius*, Lederer,‡ which occurs on the shores of the Caspian Sea; and still more distantly to *C. athamanthis*, Eversmann, from Western Siberia, and the Steppes north of the Aral Sea.

Numerous specimens of both sexes of this species were obtained by Lieutenant E. Y. Watson at Gunduk in June. He informs me that it occurs also at Quetta.

I wrote the description above under the impression that my specimens represented a new species. Mr. H. J. Elwes informs me, however, that they agree "perfectly with the var. *transiens* of Staudinger, which he considers to be a variety of *C. caspius*, Lederer." I have therefore adopted this name. Colonel Swinhoe also considered the species to be new, and sent me a description of it after mine was written. He does not say what sex he described, but it was probably a female. I append Dr. Staudinger's description§ and also Colonel Swinhoe's,

* *Polyommatus phœnicurus*, Lederer, Hor. Soc. Ent. Ross., vol. viii, p. 8, pl. i, fig. 4, *male*; 5, *female* (1871).

† Alphéraky, Hor. Soc. Ent. Ross., vol. xvi, p. 377, n. 30 (1881).

‡ *Polyommatus caspius*, Lederer, Hor. Soc. Ent. Ross, vol. vi, p. 76, pl. iv, fig. 3, *male* (1859).

§ *Chrysophanus* (*Polyommatus*) *caspius*, Lederer, var. *transiens*, Staudinger, Stett. ent. Zeit., 1886, p. 201. HABITAT: Samarkand. EXPANSE: Not given. DESCRIPTION: "Lederer first described *Polyommatus caspius* from a flown [*i. e.* worn] male, and called the forewings of this species 'Copper red, with a faint violet sheen.' This specimen was plainly so represented, and this species is not at all to be recognized from this. Subsequently he says that the male from which he copied was 'somewhat flown' [worn] and that 'fresh specimens have a beautiful violet blue sheen.' According to this, this North Persian species, which now-a-days is diffused through all the larger collections, is to be at once recognized. Unfortunately, Lederer when he received later fresh specimens, must have given away this original *caspius*, as it no longer remains in his collection. In 1881, I received from Habenhauer a greater quantity of specimens of this species, taken in July near Samarkand in the mountains lying southerly of that place, which on the upperside look exactly the same as the North Persian *caspius*; only they bear mostly at the inner angle of the hindwings one or two reddish spots before the outer margin, which are entirely wanting in the Persian *caspius*. So much the more different are they

as foot-notes.* The latter compares it with *C. pavana*, Kollar, to which it has not even a distant relationship.

The figure shews both sides of a male example from Gunduk, Biluchistan, in my collection.

Genus 139.—ILERDA, Doubleday. (Plate XXVIII).

Ilerda, Doubleday, List Lep. B. M., vol. ii, p. 25 (1847); id., Hewitson, Ill. Diurn. Lep., p. 57 (1865); *Heliophorus*, Geyer, in Hübner's Zutrage, vol. iv, p. 40 (1832).†

Forewing, triangular, *costa* gently curved, male with the *apex* acute (much rounded in *I. sena*, Kollar), *outer margin* nearly straight or somewhat convex (much rounded in *I. sena*), *inner* margin straight; in the female the apex is more rounded than in the male, and the outer margin is very convex; *costal nervure* terminating about opposite to the apex of the discoidal cell; *first subcostal nervule* well removed from the costal nervure, originating at about two-thirds of the length of the discoidal cell from its base; *second* subcostal with its base nearer to that of the upper discoidal than to that of the first subcostal; *third* subcostal somewhat long, given off about midway between the apex of the cell and of the wing; *upper discoidal* nervule originating exactly at the point where the middle disco-cellular nervule is given off; *middle* and *lower disco-cellular* nervules nearly straight and nearly upright, the lower rather longer than the middle; *second median* nervule given off a short distance before the lower end of the cell; *submedian nervure* straight. Hindwing, somewhat lengthened, usually furnished with a moderate-sized *tail* at the termination of the first median nervule; the tail, however, is reduced to a mere tooth in some species; *outer margin* somewhat varying in outline; in some species it is scalloped, in others oblique from the apex to the termination of the second subcostal nervule, thence to first median nervule straight, in others again it is evenly rounded throughout; *costal nervure* much arched at base, terminating at the apex of the wing; *first subcostal nervule* given off some little distance before the apex of the cell; *disco-cellular* nervules straight and somewhat outwardly oblique, the upper a little shorter than the lower; *second median* nervule given off a little before the lower end of the cell; *submedian nervure* straight; *internal* nervure recurved. Male with no secondary sexual characters.

Although *I. sena* differs considerably in outline and somewhat in style of markings from the other species of *Ilerda*, it has exactly the same neuration as has *I. epicles*, Godart, which is the type of the genus; in which therefore it is retained as a slightly aberrant species.

Professor Westwood (Gen. Diurn. Lep., vol. ii, p. 482 (1852) describes the *Ilerdæ* as "beautiful Indian species with naked eyes, setose palpi, antennæ with long joints ringed with

on the underside, where they seem at first glance, extremely similar to *phœnicurus*, Lederer, as on this side the hindwings are light yellow or ash-grey with red marginal spots. In the Persian *caspius* they are darker yellowish-brown with brownish marginal spots, which only very seldom turn into reddish. Also the underside of the forewings is in the variety *transiens* lighter grey, with more yellowish-red on the outer part than in *caspius*." (*Staudinger*, l. c.)

* "*Chrysophanus susanus*, n. sp. Habitat: Gunduk, Biluchistan, June, 1885 Expanse: 1 inch. Allied to *C. phœnicurus*, Lederer. Upperside. *Both wings* smoky brown, with the copper colour shewing through. *Forewing* paler than the hindwing, and of a more copper hue. *Both wings* darker towards the base, the few markings on the wings above caused by the markings below shewing through the wing. *Forewing* with three spots in the cell in a line, one being at each end and one in the middle; costal margin and hinder margin deeper brown, and a band of the same colour on the outer margin. *Hindwing* with a faint submarginal band of reddish, clearer towards the anal angle; tail as in a *C. phlœas*, Linnæus, but long and produced like a 'Hair-streak.' *Head* white with a brown centre, collar white; *eyes* and *body* brown; *antennæ* brown with white bands. Underside, *both wings* coloured and marked somewhat as in *A. panava*, Westwood [*C. pavana*, Kollar], all the spots and lines black surrounded with whitish. *Forewing* pale copper yellow, fading to whitish at the base, three spots in a line in the cell, one in the interspace below, just underneath the centre cell spot, marginal line black, a submarginal macular band with a thinner macular line between, but not reaching the hinder margin, and a discal corresponding row of spots smaller than the submarginal row. *Hindwing* coloured and marked almost exactly as in *C. panava*; two spots at the end of the cell; and five rows of spots and macular lines on the wing; subbasal row consisting of two spots; ante-medial row of four spots almost in a line, passing just inside the two spots at the end of the cell; a curved row of discal spots; a submarginal macular line; a band of white between these rows; another macular line close to the border line, which is also black with a red band between." (*Swinhoe*, MS.)

† *Heliophorus* has fifteen years priority over *Ilerda*, but as the former name has never since it was invented by Geyer for a species of this genus been used for the genus, I prefer to leave undisturbed the well-known name *Ilerda* for this group of butterflies.

white, and a very well-marked club, and with three branches to the postcostal vein [=subcostal nervure] of the forewing."

Mr. Doherty very justly remarks* "This genus is very close to *Chrysophanus*, Hübner, the prehensores being generically the same, though each species has its characteristic form." So much so is this the case, that I am unable to find a single even slight difference in neuration in the two genera by which they may be separated. *Facies* therefore is, in this case, the only guide to generic separation, and here there is difference enough; the genus *Chrysophanus* comprises butterflies which are usually of a brilliant copper colour on the upperside; this colour however is often wanting entirely in the female, and in several species allied to *C. caspius*, Lederer, there is no copper colour at all, these latter are in fact coloured above as in the aberrant species of this genus, *I. sena*, which thus becomes a distinct connecting link between the two genera, though the markings on the underside of *I. sena* are quite different from those of any *Chrysophanus*, they are also a good deal different from those of any other *Ilerda*; and, moreover, *I. sena* differs widely from all the other known species of the genus in having a female with no orange patch on the disc of the forewing on the upperside. If *I. sena* be omitted, the other species of the genus are distinguished in the males by a richness of colouring as various as it is beautiful. *I. epicles*, Godart, is a beautiful shining purple, *I. tamu*, Kollar, is rich ultramarine blue on the upperside, *I. moorei*, Hewitson, is brilliant metallic blue, *I. androcles*, Doubleday and Hewitson, is resplendant metallic green, *I. viridipunctata*, mihi, is also green but of a duller cast, and *I. brahma*, Moore, is magnificent metallic golden bronze.

The imagines almost always affect ground which has been disturbed by man, and a coarse herbage has sprung up. Their flight and habits are very similar to those of their almost congeners the "coppers," they have a rather quick flight but seldom for any distance, usually settling on leaves, and seem to be particularly fond of rubbing their hindwings over and over in the way affected by many of the *Lycænidæ*. The genus is found all along the outer ranges of the Himalayas, but never at any very great elevation, 9,000 feet being probably the highest point it reaches; it occurs also in Assam and Upper Burma, (but not in the Malay Peninsula), in Java, and again in China. Every known species is included in this work.

The transformations of *I. sena*, Kollar, are described below. The larva and pupa are of the usual lycænid shape, and agree very closely with the description of the preparatory stages of *Chrysophanus phlæas*, Linnæus.

Key to the species of Ilerda.

A. Male, upperside, both wings shining but dull violet; female fuscous, with no oblique orange discal fascia on forewing.

883. I. SENA, Western Himalayas.

B. Females, upperside, forewing with an oblique orange discal fascia.

a. Male, upperside, both wings rich shining deep purple in some lights.

884. I. EPICLES, Kumaon to Upper Assam, Arracan Hills, Upper Burma, Java, Hainan.

b. Male, upperside, both wings rich deep ultramarine blue.

885. I. TAMU, Western Himalayas.

c. Male, upperside, both wings bright iridescent metallic blue.

886. I. MOOREI, Native Sikkim, Bhutan.

d. Male, upperside, both wings bright iridescent metallic green.

887. I. ANDROCLES, Western Himalayas, Assam.

e. Male, upperside, both wings duller iridescent metallic green than in *I. androcles*, the green scales on the hindwing sparsely scattered on the disc only.

888. I. VIRIDIPUNCTATA, Kumaon, Sikkim.

f. Male, upperside, both wings magnificent iridescent golden bronzy.

889. I. BRAHMA, Kumaon, Sikkim.

883. Ilerda sena, Kollar.

Polyommatus sena, Kollar, Hügel's Kaschmir, vol. iv, pt. 2, p. 415, n. 1, pl. v, figs. 3, 4, *male* (1844); *Ilerda sena*, Horsfield and Moore, Cat. Lep. Mus. E. I. C., vol. i, p. 28, n. 30 (1857); *I. cadma*, Doubleday, List Lep. B. M., vol. ii, p. 25 (1847).

HABITAT: Western Himalayas from Kashmir to Kumaon.

* Journ. A. S. B., vol. lv, pt. 2, p. 130, n. 148 (1886).

EXPANSE: ♂, 1·2 to 1·3; ♀, 1·3 to 1·4 inches.

DESCRIPTION: MALE. "UPPERSIDE, *both wings* fuscous shot with violet. *Hindwing* tailed, a marginal dentate fulvous fascia. UNDERSIDE, *both wings* cinereous, a common rufous fascia near the margin, outwardly dotted with black, inwardly margined with whitish. *Hindwing* with two black dots." (*Kollar*, l. c.)

MALE. UPPERSIDE, *both wings* shining violet. *Forewing* with a well-defined rather broad outer black margin. *Hindwing* with the costa and outer margin rather broadly black, the latter bearing a prominent series of orange lunules enclosing rounded black spots, the last outwardly marked with fine bluish-white dots; an intensely black anteciliary line. UNDERSIDE, *both wings* dull ochreous, a fine black anteciliary line. *Forewing* with a submarginal orange lunulated band from the first median nervule decreasing to the apex, inwardly defined by a narrow white lunular line, which latter is bounded on both sides by a fine black thread, a marginal series of oval black spots between the veins, the one in the submedian interspace very large, out of line, nearer the base of the wing. *Hindwing* with the outer margin similarly marked to that of the forewing but all the markings broader, the inner white band carried down the veins in sharp points towards the outer margin; a prominent round black subcostal subbasal spot, and another near the middle of the submedian interspace; *tail* black tipped with white; *cilia* throughout alternately black and white; *body* fuscous above, white beneath; *legs* white, outwardly fuscous. FEMALE. UPPERSIDE, *both wings* dull fuscous, with no trace of the shining violet coloration present in the male; the orange lunulated submarginal fascia on the hindwing as in the male, but more or less continued on to the forewing towards the anal angle, on the hindwing with a fine blue line following its inner margin, sometimes present in the male. UNDERSIDE, *both wings* as in the male.

LARVA when about half-grown pale yellowish-greenish, the whole surface thickly shagreened and covered with rather long brownish bristly hairs, which are longer on the anterior and posterior segments and along the sides than elsewhere; there is a narrow dark dorsal line, but no other markings. In shape the larva is about as high as broad, of very nearly equal breadth throughout, hardly tapering at either end, the fourth segment rather wider than the rest, the constrictions between the segments slight. The full-fed larva is just half an inch in length when walking, of the usual lycænid shape, flattened, broader than high, both ends rounded, the segments (except the second and last) of almost equal breadth, the constrictions between the segments shallow, the whole larva pale dirty greenish mottled with dirty dull crimson, the narrow dorsal line also dull crimson, that being the only conspicuous marking possessed by the animal; the whole surface is covered with minute whitish dots, also with short fine brownish hairs, which are placed more thickly at the sides and on the posterior segment of the larva; head entirely hidden as usual under the second segment, pale greenish, anteriorly becoming rather dark; all the legs also pale greenish. Feeds on a species of sorrel. PUPA exactly ·4 of an inch in length, of the usual lycænid shape, bluntly rounded at both ends, the thorax slightly humped, a little constricted where it joins the first abdominal segment; coloration pale greenish, profusely sprinkled with blackish, entirely without markings, the whole surface roughened, being covered with minute points, but not hairy.

I am indebted to Mr. P. W. Mackinnon for the two larvæ and a pupa described above. He observed a female *I. sena* ovipositing on sorrel leaves, and on searching found three larvæ, one of which turned to a pupa on the long journey to me by post of 1,000 miles, occupying three days in transit. These specimens were obtained at Masuri, in the Western Himalayas, at 6,000 feet elevation early in March. Mr. Mackinnon assures me that ants do not attend this larva, and I was unable to find any extensile tubercles on the twelfth segment, or a mouth-like opening on the eleventh segment. Dr. G. King has kindly identified the food-plant for me as *Rumex hastatus*.

I. sena is without doubt the commonest species of the genus in the Western Himalayas, occurring to the eastwards certainly as far as Kumaon, and from about 3,000 to 9,000 feet elevation. Mr. Moore records it from Darjiling, but this is probably a mistake. Mr. Doherty

has noted that it "frequents drier and more open ground than the other species" of the genus. In Simla it used to frequent my verandah amongst the pots of flowers, and could easily be caught with the fingers. It is an aberrant species in shape and markings, and apparently more constant in the latter respect than the other species.

884. **Ilerda epicles**, Godart.

Polyommatus epicles, Godart, Enc. Méth., vol. ix, p. 646, n. 109 (1823); *Thecla epicles*, Horsfield, Cat. Lep. E. I. C., p. 92, n. 25, pl. i, fig. 3, *female* (1829); *Ilerda epicles*, Hewitson, Ill. Diurn. Lep., p. 58, n. 4 (1865); *Heliophorus belenus*, Hübner, Zutr. Ex. Schmett., figs. 785, 786, *female* (1832).

HABITAT: Kumaon, Nepal, Sikkim, Bhutan, Assam, Arracan Hills, Upper Burma, Java, Hainan (China).

EXPANSE: ♂, ♀, 1·20 to 1·55 inches.

DESCRIPTION: "MALE. UPPERSIDE, *both wings* blackish-brown, with a violet reflexion, which is of a deeper shade towards the base. *Forewing* bearing a large irregularly-rounded rufous-orange spot on the medial areola, which is smaller than in the female, consisting of a transverse cloud. *Hindwing* marked with a posterior border of the same colour, narrowed and undulated at the inner edge, being composed of confluent lunules; a narrow undulated black streak passes along the posterior margin. *Cilia* white interrupted with black at the veins, and in the forewing evanescent towards the outer apical angle. UNDERSIDE, *both wings* bright sulphureous-yellow, with a sanguineous posterior border, which in the forewing is narrow and uniform, until it approaches the inner apical [=anal] angle, where it is terminated by a short black streak edged on both sides with white; in the hindwing it is broader and ornamented internally by a series of white arcs delicately edged on both sides with black; a series of small wedge-shaped black spots, bedded in an oblong submarginal cloud of white irrorations, is arranged parallel with the black marginal thread, which is confined by the extreme fringe; a minute black dot stands between the disc and base, and two more obscure ones are distantly arranged along the inner margin. *Forewing* has besides a very faint [discal] series of brown lituræ. *Hindwing* [has a discal series of] interrupted white streaks parallel with the post-marginal border; the anal appendage is terminated by a black spot, and the *tail* has a white tip. *Body* brown above and hoary underneath; *legs* alternately white and black; *antennæ* black with delicate white bands to the commencement of the club. FEMALE. UPPERSIDE, *forewing* has a short transverse black stigma before the disc. *Hindwing* has, near the middle, a faint orange dash." (*Horsfield*, l. c.)

"MALE. UPPERSIDE, *both wings* dark brown. *Forewing* with the basal half glossed with violet-blue. *Hindwing* with a broad submarginal band of conical scarlet spots."

"There is a variety of this species from Northern India in which the males are without the orange submarginal band of the forewing on the upperside, and the females, instead of the large medial orange spot of the forewing, have an oblique band of the same colour." (*Hewitson*, l. c.)

I. epicles is certainly the commonest and probably the most variable species of the genus, it has likewise the widest range, being the only species which occurs beyond the Himalayas. In the male on the upperside of the forewing there is sometimes a faint orange irroration on the disc, this is sometimes developed into a moderately-sized spot, sometimes the spot is as large as in the female; in this case, however, the male will be at once recognised by the beautiful purple colour seen in some lights, which is restricted to a well-defined area at the base from the inner margin to the subcostal nervure, leaving the outer third of the wing and the costal area black. In the hindwing the rich vermilion-orange lunules on the outer margin vary much in number and size, the purple area being confined to a small patch on the disc. On the underside the sanguineous outer margin of both wings varies much in width and prominence, in the forewing the discal black lituræ are often absent, as are also the discal white spots on the hindwing. The female varies in the size of all the orange markings on the upperside, and of course lacks the purple coloration of the male. On the underside it varies exactly as in the male.

Its most westerly range appears to be Eastern Kumaon, where Mr. Doherty took it in the Kali Valley, 2—4,000 feet, at Askot, 5,000 feet, and the Dhoaj Mountain, 6,000 feet; it is extremely common in Sikkim and Assam at low elevations, and Dr. Horsfield notes that it "is not unfrequent in the acclivities near the confines of the extensive medial plain of Java." It has also been recorded from the Island of Hainan.

885. **Ilerda tamu,** Kollar.

Polyommatus tamu, Kollar, Hügel's Kaschmir, vol. iv, pt. 2, p. 417, n. 3, pl. v, figs, 7, 8, *male* (1844); *Ilerda tamu*, Horsfield and Moore, Cat. Lep. Mus. E. I. C., vol. i, p. 28, n. 31 (1857); id., Butler, Proc. Zool. Soc. Lond., 1886, p. 368, n. 53; *Ilerda oda*, Hewitson, Ill. Diurn. Lep., p. 58, n. 3, pl. xxiv, figs. 9, 10, *male* (1865); id., Moore, Proc. Zool. Soc. Lond., 1865, p. 508, n. 115, pl. xxxi, fig. 12, *female*; idem, id., l. c., 1882, p. 249; id., Staudinger, Ex. Schmett., p. 274, pl. xcv, *male* (1888), (*I. androcles* on plate).

HABITAT: Western Himalayas from Kashmir to Kumaon.

EXPANSE: ♂, 1·20 to 1·55; ♀, 1·20 to 1·45 inches.

Kollar's original description of tamu.

MALE. "UPPERSIDE, *both wings* dark brown, glittering with blue at the base. *Hindwing* with a short tail, with two orange-red lunules at the anal angle. UNDERSIDE, *both wings* greenish-yellow, a median blackish streak. *Hindwing* with a marginal orange-red fascia." (*Kollar*, l. c.)

Hewitson's description of oda.

"MALE. UPPERSIDE, *both wings* lilac-blue without metallic lustre, broadly bordered with dark brown. *Hindwing* with two lunular black spots crowned with orange at the anal angle. UNDERSIDE, *both wings* ochreous-yellow. *Forewing* with a spot at the end of the cell, and a transverse band beyond the middle, brown; a submarginal band of pale brown, a black spot bordered with white at the anal angle. *Hindwing* with the outer margin broadly scarlet irrorated with white and bordered above and below by lunular spots of black and white. FEMALE. UPPERSIDE, *both wings* dark brown. *Forewing* with a broad band of orange *near* the apex. *Hindwing* with a *broad submarginal band* of orange. UNDERSIDE, *both wings* like the male."

"This species seems to be distinct from *I. tamu*, Kollar, and *I. brahma*, Moore, and, besides its different colour, has the orange band at the outer margin on the underside of the hindwing much broader, as in *I. epicles*, Godart." (*Hewitson*, l. c.)

Moore's description of oda.

"MALE. UPPERSIDE, *both wings* black, basal portion clear blue. *Hindwing* with or without an indistinct reddish streak at the anal angle. UNDERSIDE, *both wings* greenish saffron-yellow. *Forewing* with three decreasing black, white-bordered spots, ascending from posterior angle. *Hindwing* with a broad ochrey-red marginal band, bordered on both sides with white, black-bordered lunules. *Cilia* black, slightly margined with white. FEMALE. UPPERSIDE, *both wings* blackish-brown. *Forewing* with a short, subapical, medially oblique, broad red band, a distinct black spot closing the discoidal cell. *Hindwing* with a broad, marginal, sinuous red band. *Cilia* brown. UNDERSIDE, *both wings* dull greenish-yellow. *Forewing* with the medial portion reddish-yellow, a short narrow blackish line subapically from the costa, and a second elongated spot closing the discoidal cell; a black spot with white inner border at the posterior angle. *Hindwing* with a broad marginal red band, bordered inwardly with a linear series of white and externally with black lunules, an indistinct transverse discal dark line." (*Moore*, l. c. in Proc. Zool. Soc. Lond., 1865.)

"Frequents rich deep forests north of Simla, occurring with *I. tamn** in sunny glades carpeted with strawberry-blossoms, in May." (*Note by Colonel A. M. Lang, R. E.*)

Butler's description of tamu.

"Common, according to Major Yerbury, but certainly not so in European collections; it has been named *I. coruscans* for him, but is not even nearly allied to that species, of which

* Colonel Lang informs me that the species referred to is *I. androcles*, Doubleday and Hewitson, and was so named in his original MS. note.

we possess the types. Kollar's figure is not good, having been taken from a worn and broken specimen, but the identity of the species is settled by the "sky-bluc gloss" of the basal half of the wings (in *I. coruscans* the colour is shining metallic emerald-green); as a matter of fact the colour is ultramarine, but a little inaccuracy in colouring is perhaps admissible in the description of a rubbed insect. Kollar says, 'We possess only a single example of this beautiful species, and it has suffered severely in transport, so that in fact only the wings are preserved,' and from the description we find that the hindwings, at least, are 'badly rubbed.'" (*Butler*, l. c.)

A good deal of confusion has arisen with regard to the correct identification of this species, owing to Messrs. Hewitson and Moore in 1865 applying the name *tamu* to a glittering green insect, which must be incorrect, as in Kollar's Latin diagnosis he speaks of it as blue (*cyaneo*), and in the German as sky-blue (*himmelblauen*). Kollar uses the word cyaneous for *Thecla nila*, *T. rama*, and *Apatura ambica*, all of which are more or less blue insects, certainly not green ones. As far as I know there is only one sky-blue *Ilerda*, so there can be no doubt about its identification. *I. moorei*, Hewitson, is blue, but of a resplendant metallic sheen quite different from *I. tamu*, and moreover *I. moorei* does not occur in the country from which Baron Von Hügel brought the types of Kollar's *tamu*.

I find that *I. tamu* is a somewhat variable species. In the male the breadth of the outer black margin of the upperside in both wings is double as broad in some specimens as it is in others, my broadest specimens being from Murree, my narrowest from Ulwas in the Chumba State, and from Naini Tal. Every gradation exists between the broadest and narrowest black-bordered specimens, the width of the border is of no specific value. On the underside the differences are even greater. The outer vermilion border varies in width just as does the black border of the upperside, there is often a prominent black disco-cellular line and a discal line on the forewing, these are often more or less obsolete, sometimes entirely absent, giving a very different appearance to the wing. In the hindwing also there is sometimes a discal black line, which is often entirely absent. The female of *I. tamu* is easily known from the females of the other species of the genus by the presence of a rich orange irrorated patch on the disc of the forewing on the underside.

I. tamu does not appear to be anywhere common, but has a wide range in the Western Himalayas between the altitudes of 7,000 and 10.000 feet, and occurs throughout Kashmir in suitable spots. Mr. Moore (Cat. Lep. Mus. E I. C.) records it from Bhutan, but this is probably a mistake. He correctly identified it at that date (1857), as he wrote "Upperside of wings with glittering blue patches," though this description would apply better perhaps to *I. moorei*, Hewitson, a species which occurs in Bhutan, but had not at that date been described.

886. **Ilerda moorei**, Hewitson.

I. moorei, Hewitson, Ill. Diurn. Lep., p. 58, n. 5 (1865); ? *Thecla saphir*, Blanchard, Comptes Rendus, vol. lxxii, p. 811, note 1 (1871); *Ilerda suphir ?* Elwes, Proc. Zool. Soc. Lond., 1882, p. 402, pl. xxv, figs. 9, *male*; 10, *female*.*

HABITAT: Bhutan (*Hewitson*), Native Sikkim.

EXPANSE: ♂, ♀, 1·35 to 1·50 inches.

DESCRIPTION: "MALE. UPPERSIDE, *both wings* brilliant metallic blue. *Forewing* with the apical half dark brown, the costal margin rufous-brown. *Hindwing* with the margins broadly rufous-brown, the anal angle with two or more scarlet lunules, the two only at the base of the tail distinct, the inner one marked below by a line of blue. UNDERSIDE, *both wings* orange-yellow, the outer margins rufous. *Cilia* white. *Forewing* with a spot of brown bordered with white near the anal angle. *Hindwing* with the outer margin broadly scarlet irrorated throughout with white, marked by indistinct lunules of brown and a submarginal line of white." (*Hewitson*, l. c.) FEMALE. UNDERSIDE, *both wings* differ from the same sex of *I. brahma*, Moore, and *I. viridipunctata*, mihi, in the ground-colour being of a darker shade of orange-yellow.

* Mr H. J. Elwes notes that he has seen a specimen of the true *I. saphir*, Blanchard, from Moupin, and that it is near to, if not identical with, *I. tamu*, Kollar.

"I am at present not able to say with certainty what is the proper name of this species, of which I received a fair series of both sexes [from Native Sikkim]. I have examined the specimens in the British Museum and in the Hewitson's collection, as well as Mr. Moore's. In that gentleman's opinion it is a new species between *I. moorei*, Hewitson, and *I. hewitsoni*, Moore, and resembles the former very closely above, but not below. The male has a more purple tinge on both wings than *I. hewitsoni*, but the female is hardly, if at all, to be distinguished from this species, which I have taken at Darjiling in December. The genus is a very difficult one, as there are four or five very nearly allied species in the Himalaya." (*Elwes*, l. c.)

I have had much difficulty in arriving at any conclusion regarding the identification of this species. The male specimens I possess from Native Sikkim on the upperside in their "brilliant metallic blue" colour agree with Hewitson's description, but may prove to differ therefrom on the underside in not having the rather prominent line defining the disco-cellular nervules and the more distinct discal line on both wings which are present in my specimens, but are not mentioned in that description. Mr. Moore may be correct in thinking these Sikkim specimens are distinct from *I. moorei*. I cannot find a description of the *I. hewitsoni* mentioned above. M. Blanchard's description of *I. saphir* from Moupin, Eastern Thibet is so short that the species can never be identified by it. However, whatever name these specimens may ultimately be known by, they represent a species quite distinct from any other in the genus. It is very rare in collections; the only specimens known to me have been obtained from the interior of Native Sikkim.

887. **Ilerda androcles**, Doubleday and Hewitson.

Thecla androcles, Westwood, Gen. Diurn. Lep., vol. ii, p. 487, n. 141; *Ilerda androcles*, Doubleday and Hewitson, l. c., pl. lxxv, fig. 2, *male* (1852); id., Horsfield and Moore, Cat. Lep. Mus. E. I. C., vol. i, p. 29, n. 32 (1857); *I. coruscans*, Moore, Proc. Zool. Soc. Lond., 1882, p. 248; id., Doherty, Journ. A. S. B., vol. lv, pt. 2, p. 130, n. 147 (1886); *I. langii*, Moore, Proc. Zool. Soc. Lond., 1883, p. 526.

HABITAT: Sylhet (*Westwood*); Western Himalayas from Kashmir to Kumaon; Shillong.

EXPANSE: ♂, 1·10 to 1·65; ♀, 1·35 to 1·50 inches.

DESCRIPTION: MALE. UPPERSIDE, *forewing* green [turning to a rich metallic blue in some lights impossible to be shown in the figure, though there has been some attempt to do this by colouring part of the hindwing blue], with the costa narrowly and increasingly, the apex very widely, and the outer margin decreasingly black. *Hindwing* with the disc and base green [of the same metallic shade and turning to blue in some lights as in the forewing], the costa and outer margin broadly black, bearing at the anal angle two orange lunules.

This description is taken from Mr. Hewitson's figure of the type specimen, which Mr. Westwood says came from Sylhet. I possess numerous specimens from Shillong which agree with this figure, except that only one of them has two orange lunules to the hindwing; all the rest have more, but this is so obviously a varietal character in every species of the genus, that it may be set aside at once as being of no specific value whatever. Mr. Moore has described as *I. coruscans* specimens from the Western Himalayas which do not appear to me to differ in the least from *I. androcles*. I append his description as a foot-note.* I do not think it necessary to criticise his diagnosis of *I. coruscans* word by word, as I possess specimens so identified by him which are identical with others from the district where the type of *I. androcles* was obtained. With regard to *I. langii*, which Mr. Moore has also described from the Western Himalayas, the only character apparently that Mr. Moore relies on as of much value for separating it from *I. androcles*, is

* *Ilerda coruscans*, Moore, Proc. Zool. Soc. Lond., 1882, p. 248; id., Doherty, Journ. A. S. B., vol. lv, pt. 2, p. 130, n. 147 (1886). HABITAT: N.-W. Himalaya; Bisahur, between Sarhan and Tranda; Dharmsala. EXPANSE: 1·3 inches. DESCRIPTION: "Smaller than *I. androcles*, Doubleday and Hewitson. MALE. UPPERSIDE, *both wings* of a denser blackish-brown colour. *Forewing* with the lower basal and discal areas, and the medial area of the *hindwing* entirely covered with glittering metallic blue scales, which in some lights are of a smalt-blue tint; two slender, short, red anal lunules. FEMALE. UPPERSIDE, *both wings* paler brown than in the male. *Forewing* with a narrow red oblique band. *Hindwing* with a marginal sinuous red band." (*Moore*, l. c.)

Mr. Doherty notes regarding this species that it "is shining greenish-blue well beyond the cell, and to the hind margin of the forewing, and over the disc of the hindwing. The clasp of the prehensores, seen from the side, is truncate and apparently unarmed."

the presence of four or five broad continuous red lunules to the hindwing on the upperside. As I have said above, this character is a most variable one and of no specific value whatever. I append a description of *I. langii.**

There is little to distinguish *I. androcles* on the underside from its allies. Both wings are yellow, with a discal dark somewhat narrow lunular line, which in the forewing does not extend below the first median nervule, in the hindwing is brought round to the abdominal margin in a well-rounded curve, and is often absent altogether; the forewing has a disco-cellular line, a submarginal dark line, beyond which the wing is sometimes marked slightly with vermilion, the usual conspicuous oval black spot inwardly defined by a narrow white line at the anal angle, beyond which is a fine narrow black line defined by a narrow white line on both sides; in the hindwing are the usual small indistinct dark dots scattered over the disc and base, the usual broad marginal vermilion band variable in width inwardly defined by white lunules, which themselves are bo unded on both sides by a black line, the vermilion band anteriorly irrorated with white, bearing outwardly towards the anal angle two or three black lunules. The female on the upperside is dull smoky-black, the forewing with a small orange discal lunule, which however varies a good deal in size, hindwing with an orange marginal band, which in my numerous specimens of this sex is not exactly the same in any two. Underside, both wings as in the male.

I. androcles has a very wide range, occurring in Kashmir, Pangi, Chumba, Middle Kunawar, and throughout the outer ranges of the Western Himalayas eastwards as far as Kumaon at any rate. It occurs again in Sylhet and Shillong, from which latter locality I possess many specimens captured by Dr. E. R. Johnson. In 1857 Mr. Moore appears to have correctly identified this species, as he describes it as "Upperside of wings with glittering green patches," and gives Sylhet as one locality for it correctly. He also cites Darjiling for it, but I have never seen a specimen from there which could be taken for *I. androcles*, though the allied *viridipunctata*, mihi, is common enough, and it is probably this species Mr. Moore took for *I. androcles*. This is certain at least with regard to the specimen captured by Lieutenant Hugo James, which is now in the Indian Museum, Calcutta, and is a true *viridipunctata*, mihi, it is referred to under *I. androcles* in the 1857 Catalogue of the Lepidoptera in the Museum of the East India Company.

888. **Ilerda viridipunctata**, n. sp. (PLATE XXVIII, FIG. 207 ♂).

I. tamu, Hewitson (*nec* Kollar), Ill. Diurn. Lep., p. 57, n. 1 (1865); id., Moore, Proc. Zool. Soc. Lond., 1865, p. 773; idem, id., l. c., 1882, p. 248; id., Doherty, Journ. A. S. B., vol. lv, pt. 2, p. 130, n. 146 (1886).

HABITAT: Kumaon, Sikkim.

EXPANSE: ♂, 1·3 to 1·7; ♀, 1·5 to 1·6 inches.

DESCRIPTION: "Allied to *I. androcles*, Doubleday and Hewitson. MALE. UPPERSIDE, *both wings* blackish-brown, with the medial, basal, and discal areas of the *forewing* and the medial area of the *hindwing* sparsely covered with dull metallic greenish-blue scales, these scales scarcely appearing below the submedian nervure on the forewing, and being less thickly disposed on the hindwing. *Hindwing* with the anal red lunules narrow and distinct. UNDERSIDE dull saffron-yellow, markings similar to those of *I. androcles*. FEMALE. UPPERSIDE, *both wings* paler brown than in the male. *Forewing* with an oblique discal slightly-curved short red band. *Hindwing* with a marginal narrow sinuous red band." UNDERSIDE, *both wings* as in the male. (*Moore*, l. c. in Proc. Zool. Soc. Lond., 1882.)

Mr. Doherty describes the male of this species as follows:—"It is merely powdered with shining greenish-blue on the upperside, which does not extend on the forewing beyond the

* *Ilerda langii*, Moore, Proc. Zool. Soc. Lond., 1883, p. 526. HABITAT: Masuri, N.-W. Himalayas. EXPANSE: *Male*, 1·25 inches. DESCRIPTION: MALE. "Near to *I. moorei*, Hewitson. UPPERSIDE, *both wings* with the metallic area of the same extent and shape as in that species, the metallic colour being of a greenish tint of nearly the same intenseness as that of *I. androcles*, Doubleday and Hewitson. *Hindwing*, marginal red band composed of four or five broad continuous lunules, in both the former named species the marginal band is composed of only two lunules. UNDERSIDE, *both wings* of a much darker yellow than in the former species." (*Moore*, l. c.)

cell or to the hind-margin, and is nearly obsolete on the hindwing. This species can easily be distinguished by the prehensores, the clasp seen from the side is very broad and rounded at the end, with a line of strong, bent hooks. The uncus seen from the side is shorter than in *I. coruscans*, and its branches are more bent. I name *I. tamu* with great doubt, being unable to distinguish between *I. tamu*, *I. androcles*, *I. moorei*, and *I. langii*. It is so difficult to describe, and so impossible to figure the colouring of an *Ilerda*, that I think that it will be very hard for the student to separate the four species mentioned, except by examination of the prehensores, which ought to be figured." From my point of view there is no great difficulty in dealing with these four species. Mr. Doherty's *tamu* is my new species, *moorei* is blue not green, *androcles* and *langii* are one species, which is green.

" FEMALE. UPPERSIDE, *both wings* dark brown. *Forewing* with a narrow band of orange *at a distance* from the apex. *Hindwing* with a narrow lunular submarginal band of orange, and under each lunule a line of pale blue. UNDERSIDE, *both wings* like the male." (*Hewitson*, l. c)

The three discriptions given above apply exactly to this very distinct species, which as far as I know is confined to Kumaon and Sikkim, but is almost sure to occur in the unexplored intervening country of Nepal. The only difficulty I have had with this species is the localities given for it by Mr. Moore when he redescribed it under the name of *tamu*, namely, "N.-W. Himalayas, Masuri (*Lang*) ; Dharmsala (*Hocking*)." There are no specimens which at all agree with this species from the Western Himalayas now in Colonel Lang's collection, and neither Colonel Lang nor I have ever seen any examples from that region which could be confounded with it. I can in no way account for the error, if it be one, of locality, given by Mr. Moore. The only characters I can give to distinguish the females of *I. viridipunctata* and *I. brahma*, Moore, are that the former is a larger insect, with the ground-colour of the underside darker, and of a greenish tinge. In Sikkim, however, the two species do not usually occur together, *I. viridipunctata* being found at much higher elevations than *I. brahma* ever attains. Mr. Otto Möller possesses two curious aberrations or " sports " (or perhaps hybrids) of the male of this species which are in some lights almost as rich a bronzy colour as obtains in *I. brahma*, only of a more greenish-brassy shade. They were taken in Sikkim with *I. viridipunctata*, so I note them under that species, though they are exactly intermediate between the two.

The figure shews both sides of a male specimen from Sikkim in my collection.

889. Ilerda brahma, Moore.

I. brahma, Moore, Horsfield and Moore, Cat. Lep. Mus. E. I. C., vol. i, p. 29, n. 33, pl. i*a*, fig. 4, *male* (1857); id., Staudinger, Ex. Schmett, p. 274, pl. xcv, *male* (1888).

HABITAT : Sikkim ; Naini Tal ; Loharkhet, Kumaon, 5-7,000 feet.

EXPANSE : ♂, 1·3 to 1·4 ; ♀, 1·2 to 1·5 inches.

DESCRIPTION : "Differs from *I. androcles*, Doubleday and Hewitson, and *I. tamu*, Kollar, in having the patches of the wings [on the upperside] glittering coppery-gold colour, and a broader and longer exterior red band to the *hindwing*." (*Moore*, l. c.) FEMALE. UPPERSIDE, differs only from that sex of *I. epicles*, Godart, in the orange patch on the forewing and the lunulated fascia on the hindwing being rather paler or more yellow in shade. On the UNDERSIDE it may at once be known by the absence of the marginal reddish-orange band on the forewing, and by the presence of a discal continuous dark line across both wings. in *I. epicles* there is occasionally a discal series of disconnected short black lines forming a fascia ; the ground-colour of both wings, and the marginal band on the hindwing also paler. The distinctions between the females of *I. viridipunctata* and *I. brahma* are given above, but the markings on the underside of these species in both sexes are identical.

I. brahma occurs commonly in Sikkim in February, March, September, October, and November. In Naini Tal Colonel Lang says that " it occurs at the same time and places as *I. tamu*, Kollar, in April and May at 7,000 feet altitude, but is much less common." *I. brahma*

is one of the most lovely butterflies in the world, the brilliant golden patches on the upperside of the male having no counterpart amongst butterflies, though they are distantly rivalled by some species of the genus *Plusia* of the tribe *Noctues* in Moths. Its range is very restricted: it is rare in Kumaon at an elevation of 5,000 to 7,000 feet, but common in Sikkim at an elevation of about 4,000 feet.

The second subgroup of the *Thecla* division of the Indian *Lycænidæ* contains twelve genera, all of which have two short filiform tails to the hindwing under half an inch in length in both sexes, arising from the terminations of the submedian nervure and first median nervule, except in the single genus *Mota*, mihi, in which the tails spring from the apices of the first and second median nervules respectively. One genus, *Zesius*, Hübner, is aberrant, in that the female has a third short tail from the end of the second median nervule. In the genus *Thamala*, Moore, both tails, but especially the outer one, are longer in the female than in the male.

The first genus, *Zesius*, Hübner, is the last of the three Indian genera (of which the two others are *Amblypodia*, Horsfield, and *Iraota*, Moore) to exhibit sexual variability with regard to the number of subcostal nervules present in the forewing, the male having four and the female three. As noted above, the number of the tails to the hindwing is one more in the female than in the male. The male has no secondary sexual characters. The coloration of the upperside of the only species which the genus contains is markedly dissimilar in the opposite sexes, the male being brilliant coppery, the female dull bluish. It is found throughout South India and Ceylon, occurring only in North India in one locality, *viz.*, the Malda district.

The next two genera, *Dacalana*, Moore, and *Arrhenothrix*, mihi, may be spoken of together, as the males exhibit a sexual character not found in any other Indian genera of the *Lycænidæ*, both having a tuft of long white hairs on the upperside of the forewing in the middle of the submedian interspace lying downwards over a patch of modified and probably glandular scales; both also have in the males a second large tuft of white hairs attached to the underside near the middle of the inner margin of the forewing and turned under and upwards, that portion of the wing being bowed outwards at the point of attachment of these hairs; further in both there is a large glandular patch of differently-formed scales on the upperside of the hindwing below the costa. In the first genus, *Dacalana*, the forewing of the male has four subcostal nervules, while the second genus, *Arrhenothrix*, has but three. It is most unfortunate that the species of both genera should be so rare, especially the females, which I have not seen. It is very desirable that the distribution of these genera should be correctly ascertained, also if the females of both have the same neuration as their respective males. At present *Dacalana* is recorded from Burma and the Malay Peninsula, but I doubt the correctness of this, and suspect that the specimens so recorded belong to the genus *Arrhenothrix*. *Dacalana* occurs also in many of the Islands of the Malay Archipelago. Two species only have been described as belonging to it. A single species of *Arrhenothrix* only is known, which occurs in Assam and the Malay Peninsula. The males of all the species of these two genera are rich cærulean blue on the upperside, the costa and apex of the forewing broadly black; underside dull brown, with a prominent pure white discal line across both wings, and a fine dark line beyond.

The next genus, *Camena*, Hewitson, shares with the two genera which immediately precede it the peculiarity of the lower disco-cellular nervule of the forewing being much longer than the middle disco-cellular; both sexes possess three subcostal nervules to the forewing. The males have a tuft of hairs turned under and upwards on the forewing near the base of the inner margin, the margin being bowed outwards opposite the point of attachment; on the hindwing on the upperside below the costa there is a glandular patch of modified scales varying in size. All the males are blue on the upperside, as in the two preceding genera, of a richer shade than in the females. The genus appears to occur throughout India, in Burma, Ceylon, and Nias Island, but so far has not been recorded from the Malay Peninsula.

The next genus, *Maneca*, mihi, is monotypic, and occurs only in Sikkim. It differs from *Camena* in possessing no secondary sexual characters on the forewing in the male, but has a glandular patch of modified scales on the hindwing in the usual position. It is dull slatey-blue on the upperside in both sexes, with the usual broad outer black margins, the underside is bluish-white, with a narrow discal broken lunular black line across both wings. Both sexes have three subcostal nervules to the forewing.

The next genus, *Mota*, mihi, is also monotypic. The single species it contains is unique, in that its two tails spring from the apices of the first and second median nervules of the hindwing instead of from the submedian nervure and first median nervule. So far the species has only been found in Bhutan and Assam. It is very rich ultramarine blue on the upperside, with the usual black outer margins, the underside being most unusually marked, as will be seen by a reference to the figure. The male has no secondary sexual characters, and both sexes possess three subcostal nervules to the forewing.

Of all the Indian genera, *Aphnæus*, Hübner, has given me the greatest trouble and leaves my hands in the least satisfactory condition. Much of this difficulty is due to the considerable extent of the sexual dimorphism which obtains in it, the full amount of which awaits investigation by local observers. The genus is very ordinary as far as structure goes; it has three subcostal nervules to the forewing, the upper discoidal and middle disco-cellular nervules have a common origin (this is perhaps rather an unusual character), and the male has no secondary sexual characters. The genus is very wide-spread, occurring plentifully in Africa, in Asia Minor and Persia, almost throughout India, even in the desert tracts, in Ceylon, the Andaman Isles, Burma, and the Malay Peninsula and Archipelago. India may be considered to be its head-quarters, as about thirty species have been recorded from that region. The males are almost always glossed with iridescent blue on the upperside, this coloration never appearing in the females. Any species of the genus can at a glance be recognised as belonging to it, from the quite unique style of markings. These consist of broad bands (usually) on the underside of both wings, very often marked with silver.

Tajuria, Moore, is probably a large genus and probably also has a wide range, but it has been constituted so lately that I can give neither fact with accuracy. The neuration is very ordinary; the length of the third subcostal nervule of the forewing is variable, being much longer in some species than in others; both sexes have three subcostal nervules only to the forewing; the middle disco-cellular nervule is shorter than the lower; and, except in one species, the males have no secondary sexual characters. All the species are of some shade of blue or purple on the upperside, richer and brighter in the males than in the females. *Tajuria* occurs with certainty almost throughout the Indo-Malayan region.

The next genus, *Suasa*, mihi, is probably larger than is at present known to the writer; up to this but a single species has been placed in it. The neuration of the type species is unusual, the third subcostal nervule of the forewing being very short, while the internal nervure of the hindwing is very long. The forewing has three subcostal nervules only in both sexes. *S. lisides*, Hewitson, is quite a small butterfly, but it has the inner tail longer than in any genus of the *Thecla* group. The male is black on the upperside, with an orange discal patch, the base of the wing blue, as is also the greater portion of the hindwing. The female is sooty-brown on the upperside, the anal region of the hindwing white, bearing two large round black spots. The species is known from Assam and Burma only.

The three genera which follow have two subcostal nervules to the forewing only in both sexes *Thamala*, Moore, contains two described species, which are probably really one, occurring in Burma, the Malay Peninsula, Sumatra, and Borneo. The male has a small streak of modified scales along the submedian nervure towards the base of the forewing on the underside. The tails of the female are longer than those of the male, especially the outer one. The male is brilliant scarlet on the upperside, with the costa, apex, and outer margin of the forewing broadly black; the female has the disc of the forewing dull red, the anal half of the hindwing white, the rest of the wing black.

The next genus, *Hypolycæna*, Felder, contains but three species in India, which occur in Sikkim, Assam, Burma, the Andamans and Nicobars, South India, and Ceylon ; two of these are found also in the Malay Peninsula and Archipelago. The male of one species has a glandular discal patch of modified scales on the upperside of the forewing, the others do not possess any secondary sexual characters. *H. erylus*, Godart, is deep blue above in the male, the female is smoky black. *H. thecloides*, Felder, and *H. nilgirica*, Moore, are reddish-brown on the upperside in both sexes. The genus occurs throughout the Malay Peninsula, and probably also in Africa.

The last genus of the subgroup is the *Chliaria* of Moore. The neuration is a little aberrant, as the first subcostal nervule of the forewing almost touches the costal nervure for some little distance, the two veins being inclined towards one another ; the males have no secondary sexual characters. All the species contained in the genus are small, and are more or less blue on the upperside in the males. The females of two out of the four species known to belong to the genus are dull brown on the upperside with no trace of blue coloration, and have the discal areas of both wings often whitish. *Chliaria* occurs in the Himalayas, Assam, Burma, Bombay, and the Andaman Isles.

Genus 140.—ZESIUS, Hübner. (Plate XXVIII).

Zesius, Hübner, Verz. bek. Schmett., p. 77 (1816) ; id., Moore, Lep. Cey., vol. 1, p. 100 (1881) ; *Ialmenus* (*part*), Hewitson, Ill. Diurn. Lep., p. 53 (1865).

"Forewing, triangular ; *costal nervure* short, curved ; *first subcostal* nervule emitted at one-half, *second* subcostal at one-third before the end of the discoidal cell ; *third* subcostal trifid, emitted close to the end of the cell ; *fourth* subcostal at one-half and *fifth* subcostal at beyond two-thirds ; *disco-cellular* nervule slightly recurved ; *upper discoidal* nervule from the end of the cell ; *lower* discoidal from the middle of the disco-cellular nervule ; *discoidal cell* short, broad ; *second median nervule* at one-sixth before the end of the cell, *first* median at nearly half before the end ; *submedian nervure* nearly straight. Hindwing, short, broadly produced hindward ; *apical margin* [*costa*] very convex, *exterior* margin angled at the end of the second and first median nervules and at the submedian nervure, with a slender *tail* from the first median nervule and submedian nervure in the male, and a third tail from the second median nervule in the female ; *costal nervure* much arched from the base ; *first subcostal nervule* emitted at one-half before the end of the cell ; *disco-cellular* nervules slightly obliquely recurved ; *discoidal* nervule from their middle ; *discoidal cell* broad ; *second median nervule* from one-sixth, and *first* median at nearly one-half before the end of the cell ; *submedian nervure* straight, *internal* nervure much recurved. Body stout ; *palpi* long, slender, porrect, squamose, second joint projecting half beyond the head, third joint very slender, one-fourth the length of the second, pointed ; *legs* squamose ; *antennæ* with a lengthened club gradually thickening to the tip. *Eyes* smooth. Type, *Zesius chrysomallus*, Hübner." (*Moore*, l. c.)

In the forewing the costal nervure terminates opposite to the apex of the discoidal cell ; the base of the second subcostal nervule is equi-distant between the bases of the first subcostal and upper discoidal nervules, the third subcostal nervule originates about midway between the apices of the cell and of the wing, the fourth subcostal nervule (present in the male only) is very short, shorter than the terminal portion of the subcostal nervure (which latter reaches the outer margin below the apex of the wing in the male), and is given off near to the apex of the wing ; in the male the middle disco-cellular nervule is given off from the upper discoidal nervule close to its base, in the female the middle disco-cellular and upper discoidal nervules have a common origin ; the disco-cellular nervules are slightly concave, nearly upright, the middle one not quite as long as the lower ; the second median nervule has its origin a little before the lower end of the cell. In the hindwing the disco-cellular nervules are of about equal length, the upper recurved, outwardly oblique, the lower slightly concave, nearly upright ; the second median nervule originates a little

before the lower end of the cell. In both sexes the tail from the third median nervule is the longest, twice as long as the one from the submedian nervure, the additional tail present in the female only from the second median nervule is the shortest of all.

In this genus the sexes are equally balanced, the male has an extra subcostal nervule to the forewing, the female has an extra tail to the hindwing. It is strange that Mr. Moore should have overlooked the dissimilarity in the number of subcostal nervules to the forewing which exists in the opposite sexes of the type species of this genus, though it was pointed out by Mr. Hewitson. The dissimilarity in the coloration of the sexes on the upperside is also remarkable, the male being brilliant coppery, the female dull blue and black. The genus contains but a single species, which occurs in the Malda district of Bengal, several parts of the Bombay Presidency, in Ganjam, throughout south India, and in Ceylon. The transformations of *Z. chrysomallus* are described when treating on that species.

890. **Zesius chrysomallus,** Hübner. (PLATE XXVIII, FIGS. 208 ♂, 209 ♀).

Z. chrysomallus, Hübner, Zutr. Ex. Schmett., figs. 301, 302, *male* (1823); id., Moore, Lep. Cey., vol. i, p. 100, pl. xl, figs. 4, *male*; 4*a*, *female*; 4*b*, *larvæ* and *pupa* (1881); *Chrysophanus? chrysomallus*, Westwood, Gen. Diurn. Lep., vol. ii, p. 499, n. 28 (1852); *Dipsas chrysomallus*, Moore, Horsfield and Moore, Cat. Lep. Mus. E. I. C., vol. i, p. 33, n. 41 (1857); *Ialmenus chrysomallus*, Hewitson, Ill. Diurn. Lep., p. 55, n. 5, pl. xxiv, figs. 4, 5, *female* (1865).

HABITAT: Malda, Bombay, Ganjam, Nilgiris, Ceylon.

EXPANSE: ♂, 1·3 to 1·7; ♀, 1·6 to 1·9 inches.

DESCRIPTION: "MALE. UPPERSIDE, *both wings* pale cupreous, outer margins brownish; at anal angle of *hindwing* three blackish spots. Three [two] tails. UNDERSIDE, *both wings* pinkish creamy-white, a band composed of roundish pinkish spots disposed irregularly across the wings. *Forewing* with five, and *hindwing* with eight pinkish spots towards the base; anal angle with three spots, the two outer ones black banded above with red, and the middle one bluish; near the outer margin is a line of indistinct marks; extreme outer margin and tails pinkish. FEMALE larger, wings more square. UPPERSIDE, *both wings* brown, tinged with bluish at the base; spots on the UNDERSIDE as in the male, but of a brighter colour." (*Moore*, l. c. in Cat. Lep. Mus. E. I. C.)

"LARVA elongated, dorsally thickened, sloping at both ends; green, the segments with lateral purple-brown small pointed tubercles, which are stouter and longer on the anterior segments; a pale yellowish lateral line between the tubercles. Earlier stage purple-brown. Feeds on *Terminalia*. PUPA green, spotted with purple-brown." (*Moore*, l. c. in Lep. Cey.)

This species is quite unmistakable, having no near allies, but I give as a foot-note a more detailed description of it.* Mr. W. H. Irvine has taken it in large numbers at Bholahât in the Malda district of Bengal, a singularly isolated locality in which to find it, and as far as I know it occurs nowhere in the surrounding country for hundreds of miles. In the Bombay Presidency it occurs at Alibagh in January and March, also at Hasvira, Kolaba district, in January. It is found also in North Canara in September, in Ganjam, and in the Nilgiris in April at 2,000 feet elevation. In Ceylon it occurs at "Colombo on cashew-trees in the cinnamon gardens. Flight rapid, darting from tree to tree, often settling in the cashew and cinnamon leaves" (*Hutchison*). "Kandy, Hambantotte, Colombo, settles on rather high bushes; when disturbed circles round and soon returns. Common" (*Wade*).

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* "MALE. UPPERSIDE, *both wings* pale cupreous-red, costal and outer borders narrowly brown. *Hindwing* with three black spots from the anal angle bordered by a marginal slender greyish-blue line. UNDERSIDE, *both wings* greyish buff-white. *Forewing* with two pale reddish-brown spots within the cell, another below the cell, a paler disco-cellular lunule, a transverse catenulated band, and a less distinct submarginal lunular line. *Hindwing* with two reddish-brown spots on the inner side of the costal nervure, two within the cell, two below the cell, one on the abdominal margin, a paler disco-cellular lunule, a broken catenulated discal band bent up at the lower end, and a submarginal lunular line; three anal black spots, the first and third with a red inner border, the middle spot almost obliterated by blue-grey speckles. *Body* and *palpi* above brown. FEMALE. UPPERSIDE, *both wings* violet-brown, the basal and discal medial areas, including the cell, pale blue *Hindwing* with an outer marginal slender black and white line, and blackish pale-bordered spots, the second and third anal spot darkest, the third bordered within by a red lunule; *tails* with red and white borders." UNDERSIDE, *both wings* as in the male. (*Moore*, l. c. in Lep. Cey.)

Figure 208 shews both sides of a male specimen from Ceylon, and figure 209 both sides of a female example from Bholahât, both in my collection.

Genus 141.—DACALANA, Moore.

Dacalana, Moore, Journ. A. S. B., vol. liii, pt. 2, p. 36 (1884); id., Distant, Rhop. Malay., p. 240 (1884).

" MALE. FOREWING, comparatively more triangular than in typical *Iolaus* (*I. helius*, Fabricius, a West African species), the *exterior margin* being somewhat oblique, and the *posterior* margin shorter; *venation* similar; on the upperside of the typical species, between the median and submedian nervures, is a tuft of fine hairs covering a small glandular-scaled spot, and on the underside there is also a tuft of hairs on the middle of the posterior margin. HINDWING, comparatively broader, being less produced hindward, the *apex* more convex, and the glandular subcostal spot less prominent. Type, *D. vidura*, Horsfield." (*Moore*, l. c.)

With reference to this diagnosis, Mr. Distant remarks that *Iolaus helius*, Fabricius, " has four [*i.e.*, three, if the terminal portion of the subcostal nervure is not counted as an additional subcostal nervule] subcostal nervules, whilst the typical species of *Dacalana* possesses five [*i.e.*, four] subcostal nervules." This I can partially confirm, as I possess a male of *D. vidura* Horsfield, from Western Java, which certainly possesses four subcostal nervules to the forewing, and it is from the lack of this additional nervule that I have separated off the genus *Arrhenothrix* which follows from *Dacalana*.

I do not consider it necessary to describe the venation of this genus in full, as the difference in the number and position of the subcostal nervules in it and in *Arrhenothrix* (which I have fully described) are the only points of difference between the two genera as far as I know. They are the only genera occurring in India which have a tuft of hairs in the male on the upperside of the forewing.

Dacalana occurs in Burma, the Malay Peninsula, Nias Island, Sumatra, Java, Bantam, and Borneo. Two species only have hitherto been placed in the genus, both of which are described below.

891. Dacalana burmana, Moore.

D. burmana, Moore, Journ. A. S. B., vol. liii, pt. 2, p. 36 (1884).

HABITAT: Moulmein.

EXPANSE: ♂, 1·5 inches.

DESCRIPTION: MALE. " UPPERSIDE, *both wings* differ from typical *D. vidura*, Horsfield, from Java, in its darker blue colour. UNDERSIDE, *both wings* differ also in being brighter and of an ochreous-brown tint, the transverse white band is somewhat broader, the submarginal black line composed of short curved portions between the veins, and the whole series forms a more curved line in crossing each wing. *Hindwing* has the black subanal and lobe-spot slightly smaller, and the former is but very slightly surmounted with red." (*Moore*, l. c.)

I have not seen this species. On rediscovery it is very desirable that the number of subcostal nervules in the forewing possessed by it should be noted and recorded, as the species may belong to the allied genus *Arrhenothrix*.

I give below a description *D. vidura*, Horsfield, the type and only other known species of the genus, which occurs in the Malay Peninsula and Archipelago.*

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* *Dacalana vidura*, Horsfield. *Amblypodia vidura*, Horsfield, Cat. Lep. E. I. C., p. 113, n. 45; *Thecla vidura*, l. c., pl. i, figs. 6, 6*a*, *male* (1829); *Iolaus vidura*, Hewitson, Ill. Diurn. Lep., p. 43, n. 10 (1865); id., Kheil, Rhop. Nias, p. 31, n. 101 (1884); *Dacalana vidura*, Moore, Journ. A. S. B., vol. liii, pt. 2, p. 36 (1884); id., Distant, Rhop. Malay., p. 241, n. 1, pl. xxi, fig. 27, *male* (1884). HABITAT: Java (*Horsfield*); Sumatra (*Hewitson*); Nias Island (*Kheil*); Borneo (*Moore*); Penang, Malacca, Singapore, Bantam (*Distant*). EXPANSE: *Male*, 1·2 to 1·9 inches. DESCRIPTION: " MALE. UPPERSIDE, *both wings* bright azure with a snowy refulgence spread as a delicate white powder over the surface, while the ground-colour assumes in a different aspect a pale sea-green cast. *Forewing* ornamented with a delicate white silky brush-like appendage, reflected and closely applied to a blackish spot on the middle of the disc; the margins are black, gradually increasing in breadth to the tip, being separated by a curved boundary from the azure ground. *Hindwing* with the posterior border marked witb a black tbread extending to the anal appendage, which bears besides a black lunule; the extreme *cilia* is gray; in the exterior [costal] margin is a hemispherical

Genus 142.—ARRHENOTHRIX, nov. (PLATE XXVIII).

MALE. FOREWING, *costa* considerably arched, *apex* rather acute, *outer margin* slightly outwardly oblique from apex to termination of lower discoidal nervule, then straight to inner angle, *inner* margin sinuous, produced into a bluntly rounded lobe near the middle, to which is attached on its extreme outer edge a tuft of long white hairs lying flat against the underside of the wing and turned upwards; in addition to this there is another tuft of long white hairs attached to about the middle of the submedian interspace on the upperside of the wing, which is turned downwards, lying across a patch of dark scales differently formed to the other scales on the wing; *costal nervure* terminating opposite to the apex of the discoidal cell, *second subcostal nervule* with its base equidistant from the bases of the first subcostal and upper discoidal, *third* subcostal arising a little nearer to the apex of the wing than to the apex of the cell; *middle disco-cellular* nervule arising from the upper discoidal a little beyond its origin, *lower* disco-cellular upright, in the same straight line as the upper disco-cellular, about twice as long as that nervule; *second median* nervule arising just before the lower end of the cell, *first* median arising near to the second; *submedian nervure* straight. HINDWING with two filamentous *tails* about ·2 of an inch in length from the apices of the submedian nervure and first median nervule; *costa* much arched, *apex* very rounded, *outer margin* nearly straight, posteriorly indented between the veins, a well-formed *anal lobe*, just above which the *abdominal margin* is emarginate, then convex to base of wing; a large rounded patch of dark differently-formed scales on the upperside of the wing in the costal interspace, which covers the base of the subcostal interspace and also extends somewhat into the discoidal cell; *costal nervure* arched, not reaching the apex of the wing; *first subcostal nervule* slightly arched, reaching the apex; *upper disco-cellular* nervule straight, slightly outwardly oblique, *lower* disco-cellular also straight, outwardly oblique, but even less so than the upper disco-cellular, a little longer than the upper; *second median* nervule arising immediately before the lower end of the cell; *submedian nervure* straight; *internal* nervure recurved. *Antennæ* exactly half the length of the costa of the forewing, with a long, gradually-formed slender club. *Eyes* naked. *Palpi* rather long, porrect, not rising above the level of the middle of the eyes, scaly.

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denuded silvery spot, corresponding with a delicate brush of lengthened hairs on the underside of the forewing; the interior border is covered with a delicate whitish down, slightly fringed with gray. UNDERSIDE, *both wings* grayish-brown with a very faint livid lustre; a strongly pronounced broad snow-white band passes in a straight line through the middle of both wings to the anal region of the hindwing, where it becomes narrower, and after several minute curves, stretches obliquely to the interior margin; between this and the hinder margin is a very delicate blackish thread composed of small linear fragments, in close contact, arranged in a regular curve across the forewing, slightly interrupted and curved in the hindwing, forming in the anal region a delicate edge along the medial white band. *Hindwing* further marked within the posterior margin with a row of oblong spots of the ground-colour enclosed within a double series of white lunules, and continued in the anal region by two very large circular black ocellate spots, the exterior one being surmounted by a large oblong patch of a bright orange tint abruptly terminated at its contact with the black striga, the interior one occupying the anal appendage, being covered internally with a white arc sending off a short oblique line along the inner margin; the space between the ocelli is gray, irregularly irrorated with black and marked in the middle by an indistinct white lunule, a brilliant white thread passes along the entire anal region, exterior to which is a continued black marginal thread, and finally a grayish *cilia*. *Body* with a varying bluish or sea-green tint above, covered with a yellowish down underneath. *Antennæ* brown, with a closely catenulated lateral white line extending to the origin of the club, the tip of which is ferruginous. *Tails* black with a white tip and grayish cilia."

"This species, as appears from a drawing in the possession of General Hardwicke, is also found on the continent of India. In Java it is comparatively rare, a single male specimen was brought to England." (*Horsfield*, l. c.)

"Male with the tuft of hair at the meeting of the wings *white*. FEMALE like the male, except that it is of a paler blue."

"Female variety. With the margins of the forewing broader and paler, a white spot at the end of the cell. Hindwing rufous-brown, the middle only blue." (*Hewitson*, l. c.)

My knowledge of this species is confined to a single male from Western Java in my collection. Mr. Hewitson records the species from Sylhet, but in all probability he failed to detect that the allied species I have described as *Arrhenothrix penicilligera* differs in structure and markings from the true *D. vidura*, Horsfield. It is more than doubtful I think that the specimens Mr. Distant records from the Malay Peninsula belong to this genus rather than to the *Arrhenothrix penicilligera*, mihi, as I possess a specimen from the Straits Settlements which has both the neuration and markings of the latter species, and not of *Dacalana vidura*, in favour of which supposition is the fact that in the specimen figured by Mr. Distant as *D. vidura* the white discal band on the underside of both wings is of the same width as in *A. penicilligera*. It would be a little remarkable if two such closely-allied genera should be found to occur side by side.

Arrhenothrix differs from *Dacalana*, Moore, in possessing three subcostal nervules only to the forewing instead of four, and the third subcostal arising consequently nearer to the apex of the wing. Type, *Arrhenothrix penicilligera*, mihi.

As far as I am aware, *Arrhenothrix* is confined to Assam and the Malay Peninsula, but the *Dacalana burmana* of Moore may belong to this genus, in which case its range would be extended to Burma. Mr. Distant records *Dacalana vidura*, Horsfield, from the Malay Peninsula, but I consider it more than probable that that genus does not occur in the Straits Settlements, but is replaced by the type species of the genus under notice, as I possess a single male from Selangor, which agrees almost exactly with specimens from Sylhet.

892. **Arrhenothrix penicilligera**, n. sp. (PLATE XXVIII, FIG. 214 ♂).

Iolaus vidura (part), Hewitson, Ill. Diurn. Lep., p. 43, n. 10 (1865).

HABITAT : Sylhet (*Hewitson*), Assam, Malay Peninsula.

EXPANSE : ♂, 1·5 to 1·6 inches.

DESCRIPTION : MALE. UPPERSIDE, *both wings* clear rather pale azure blue. *Forewing* with the costa almost up to the subcostal nervure, the apex very broadly, the outer margin decreasingly and ending in a point at the anal angle deep black. *Hindwing* with the costa broadly whitish, the apex of the wing black, the outer margin bearing a black thread, the anal lobe blackish, the abdominal margin whitish. UNDERSIDE, *both wings* rather pale brown, crossed by a narrow pure white band at the middle, beyond which is a narrow blackish line broken up into fragments between the veins. *Forewing* with the inner margin broadly whitish, highly polished. *Hindwing* with small whitish marks placed outwardly against each section of the narrow blackish line from the costa to the first median nervule, below which vein the blackish line is strongly zigzaged and bordered on both sides by a white line ; a submarginal series of small whitish spots from the costa to the second median nervule ; a small rounded black spot in the first median interspace, anteriorly bordered with a broad rust-red ring ; the submedian interspace from the discal line to the margin thickly sprinkled with white and black scales, which extend into the interspace beyond below the black spot ; *anal lobe* black ; *tails* black, tipped with white ; *body* blue above, ochreous-whitish below.

My knowledge of this species is confined to four male specimens captured by the Rev. Walter A. Hamilton in the Khasi Hills, three of which he has presented to me, and one from Selangor in the Malay Peninsula. *A. penicilligera* differs from a West Javan specimen of *Dacalana vidura*, Horsfield, kindly given to me by Mr. H. J. Elwes, on the underside of both wings in having the ground-colour darker, and the white discal band less than half as wide, and its edges more clearly defined, the black spot in the first median interspace of the hindwing smaller, with the anterior rust-red lunule smaller and less prominent. The female is unknown.

Mr. Doherty, in writing of this species under the name of *D vidura*, says that it "has the habit of alighting on the underside of leaves (with closed wings), disappearing in the act as if by magic. *D. vidura* is a ground-butterfly, living amongst bushes. *Neomyrina hiemalis*, Godman and Salvin, which alights in precisely the same manner, is on the other hand a tree butterfly, and rarely descends within reach of the net." He also notes that *A. penicilligera* is rare in Assam, but *D. vidura* is common in the Malayan region.

Mr. Hewitson, in speaking of *D. vidura*, says that "examples of this species from Silhet have the anal angle of the hindwing longer than those brought by Mr. Wallace from Sumatra." This character is not observable as compared with a Javan specimen of that species, but my single example from the Malay Peninsula certainly has the hindwing more rounded and less produced that specimens from the Khasi Hills.

The figure shows both sides of the type male specimen from the Khasi Hills in my collection.

Genus 143.—CAMENA, Hewitson. (Plate XXVIII).

Camena,* Hewitson, Ill. Diurn. Lep., p. 47 (1865); id., Moore, Proc. Zool. Soc. Lond., 1883, p. 529; *Pratapa*, Moore, Lep. Cey., vol. i, p. 108 (1881).

"Forewing, triangular, *costal margin* nearly straight, *outer* margin slightly curved outwards, shorter than the other margins, *inner* margin slightly projecting near the base, where it is clothed with a tuft of hair on its underside; *costal nervure* extending to the middle of the margin; *subcostal* nervure with three branches, two before the end of the cell, the third at a distance from the apex; *discoidal cell* half the length of the wing, closed by two *disco-cellular nervules* in a straight line, the second [lower] three times as long as the first [middle], joining the third median nervule a little beyond its base; the *upper discoidal nervule* leaves the subcostal nervure before the end of the cell. Hindwing, with two slender *tails*; the abdominal fold and anal angle clothed thickly with long hair; *costal nervure* continued to the apex of the wing, *subcostal* nervure branched before the end of the cell, *discoidal cell* short, closed obliquely by *disco-cellular nervules* of equal length, [the lower] joining the third median nervule a little beyond its base. Head, large; *eyes* smooth, the space between them prominent, thickly clothed alternately with black and white hair; *palpi* smooth, very erect, long, the second joint compressed, rising above the head, the terminal joint of the male as long as the second; *antennæ* of moderate length, with numerous short joints indicated by white on the underside. Body, robust."

"The species of this genus, though nearly allied to those of *Deudoryx* [= *Deudorix*, Hewitson], differs from them in having its eyes smooth, its antennæ shorter, and in being without the distinct lobe of the hindwing. It resembles nearly some of the species which compose the second section of the genus *Myrina*, Fabricius, but differs from them also in its smooth eyes, in possessing a third subcostal nervule [to the forewing], and in the greater length of the terminal joint of the palpi. In colour, and in having the tuft of hair between the wings, it appears to come near *Iolaus*, Hübner, but has very different palpi." (*Hewitson*, l. c.)

"Forewing, triangular, *costa* arched at the base, *apex* pointed, *exterior margin* convex below the apex, *posterior* margin convex in the middle and with a tuft of hair beneath; *discoidal cell* recurved, long; *first subcostal nervule* emitted at half length of the cell, *second* at one-third, *third* at one-eighth, *fourth* at one-half from below third, *fifth* from the end of the cell; *upper disco-cellular* nervule short, oblique, *lower* disco-cellular slightly concave; *discoidal* nervule from their angle; *second median* nervule from one-eighth and *first* median from one-third before the end of the cell; *submedian nervure* straight. Hindwing, broadly conical, with a glandular depression at the base of the subcostal nervure; *costa* much arched, *exterior margin* sinuous, *abdominal* margin long; furnished with two *tails*, anal angle lobed; *costal nervure* abruptly arched at the base and curved towards the middle; *first subcostal nervule* emitted at one-half before the end of the cell; *discoidal cell* broad; *disco-cellular nervules* obliquely recurved; *discoidal* nervule from their middle; *second median* nervule emitted at one-fifth, and *first* at nearly one-half, before the end of the cell; *submedian nervure* straight, *internal* nervure much recurved. Body very robust, *abdomen* short; *palpi* porrect, second joint not extending beyond the head, third joint very long, two-thirds the length of the second, slender and pointed at tip; club of *antenna* stout; femora of the *forelegs* slightly pilose beneath. Type *C. ctesia*, Hewitson." (*Moore*, l. c. in Proc. Zool. Soc. Lond.)

In the forewing the costal nervure terminates opposite to the apex of the cell, the second subcostal nervule has its base rather nearer to that of the first subcostal than to that of the upper discoidal, the third subcostal is long, arises about midway between the apices of the cell and of the wing, the middle disco-cellular nervule arises from the upper discoidal soon often the origin of the latter, is very short, half (or less) the length of the lower disco-cellular, slightly outwardly oblique, the lower disco-cellular upright, slightly concave, second

* Mr. Scudder says that *Camena* is preoccupied through *Camæna*, the latter name having been used three years earlier by Baly for a genus of *Coleoptera*. As, however, the name has been adopted in the key to the genera which has already been printed off, it could not without inconvenience be discarded here in favour of *Pratapa*, Moore, which latter should hereafter be used.

median nervule arising a little before the lower end of the cell. In the male the tuft of hairs attached to that portion of the inner margin which is strongly bowed outwardly is very long and thick. In the hindwing in the male is a large circular glandular patch of scales, the centre of which is usually the area formed at the junction of the subcostal nervules, but the patch extends much beyond this triangular space in every direction; the upper disco-cellular nervule is outwardly oblique, the lower of equal length, straight, outwardly oblique, but less so than the upper disco-cellular.

This genus is fully distinct from *Iolaus*, Hübner, as described by Mr. Moore,* which, though it appears to have much the same male secondary sexual characters, is described as having four subcostal nervules to the forewing; it is also distinct from the same genus as described by Mr. Trimen†, who states that the South African species have usually the male sexual characters of *Camena*, and the same number of subcostal nervules (three) to the forewing, but have the disco-cellular nervules of the forewing "of about equal length," while in *Camena* the middle disco-cellular is always less than half the length of the lower. It would appear therefore that true *Camena* does not occur in South Africa, but is replaced by *Iolaus*, Hübner, and by two genera as yet unnamed, one with, the other without, male secondary sexual characters, the species of which Mr. Trimen places under *Iolaus*. No more needed work exists in the way of systematisation of the *Rhopalocera* than as revision of the genera of the *Lycænidæ* of the world. At present, workers at local faunæ appear hardly ever to agree as regards generic nomenclature, unless the classification of fifty years ago is alone accepted, and their work is made all the more difficult from the impossibility of obtaining for examination the types of the various genera which have been described.

I have no hesitation in sinking the genus *Pratapa*, Moore, under *Camena*. As will be seen from the description below,‡ the characters relied on to separate them are very slight, chiefly confined to outline of wings; the neuration is precisely the same, as also are the male secondary sexual characters, as I have ascertained by bleaching specimens of the type species of both genera. I have also added to *Camena* the *Iolaus cotys* of Hewitson, which Mr. Moore has recently placed in his genus *Dacalana*. This species, however, lacks the secondary sexual characters of the male, unique amongst Indian *Lycænidæ*, consisting of a tuft of hair on the *upperside* of the forewing in the submedian interspace, which is typical of *Dacalana*.

None of the species of *Camena* can be said to be really common, though the males of *C. ctesia*, Hewitson, are met with in Sikkim in considerable numbers owing to their habit of coming down to the water-side to suck up moisture from the sand. All have a very swift fligh and settle on the leaves of trees and bushes. *C. cleobis* in Calcutta is much attracted—as are almost all *Lycænidæ*—by the clear honey-like fluid distilled by the flowers of the *Poinsettia*, otherwise the butterfly is seldom seen. All the species are rich blue on the upperside, with a more or less broad black costal and outer margin to both wings. The underside is white, dull sordid white, or brown, always with a discal series of spots or a line, sometimes with the disco-cellular nervules defined by a dark line, always with two black spots crowned with orange towards the anal angle of the hindwing. The females on the upperside are also always blue but of a paler duller shade than in the males, often with a submarginal series of black spots between the veins on the hindwing. I am unable to give any indication of the distribution of the genus as understood by me outside Indian limits, though I may note that it is remarkable that no species has as yet been recorded from the Malay Peninsula. It is almost sure to occur in the Malay Archipelago also.

* Journ. A. S. B., vol. liii, pt. 2, p. 34 (1884).

† South-African Butterflies, vol. ii, p. 125 (1887).

‡ Genus *Pratapa*, Moore, Lep. Cey., vol. i, p. 108 (1881). "Allied to *Iolaus*, Hübner, and *Camena*, Hewitson. From the latter it differs in having the FOREWING narrower and comparatively longer, the *costa* straighter. HINDWING, shorter, less produced hindward, the exterior margin below the apex even. *Palpi* with second joint longer and the third joint shorter. MALE with a tuft on the posterior margin of the forewing and a glandular costal patch on the hindwing as in *Camena*. From typical *Iolaus* (*I. helius*, Fabricius) this genus differs in the more triangular form of the forewing, the hindwing having a uniformly arched costa with the costal nervure extending to its apex; the discoidal cell is less triangular, the disco-cellular nervules shorter and recurved. Type, *P. deva*, Moore." (*Moore*, l. c.)

Key to the Indian species of Camena.

A. Underside, both wings brilliant metallic polished silvery.

893. C. CIPPUS, Bhutan, Assam.

B. Underside, both wings white, dull white, or brown, not highly polished.

a. Male, upperside, forewing with the blue area marked with a prominent large oval black spot on the disc, and another on the inner margin.

894. C. CTESIA, Sikkim, Assam.

b. Male, upperside, forewing never marked with prominent black spots on the disc and inner margin.

a[1]. Underside, both wings with the ground-colour white or dull white.

a[2]. Male, upperside, both wings light blue, that colour occupying half the forewing ; discal line on the underside much broken.

895. C. DEVA, Himalayas, Malda, Kanara, Ceylon, Burma, Nias Island.

896. C. LILA, Sylhet.

b[2]. Male, upperside, both wings dark blue, that colour much restricted on the forewing ; discal line on the underside nearly continuous.

897. C. ICTAS, Himalayas.

b[1]. Underside, both wings with the ground-colour pale brown.

a[2]. Underside, both wings with a broad white discal band.

898. C. COTYS, Nepal, Sikkim, Sylhet.

b[2]. Underside, both wings with no broad white discal band.

899. C. CLEOBIS, Western Himalayas, Bengal, Assam, Nilgiris.

900. C. ISTER, India.

893. Camena cippus, Fabricius.

Hesperia cippus, Fabricius, Ent. Syst., vol. v, Suppl., p. 429, n. 43-4 (1798) ; *Polyommatus cippus*, Godart, Enc. Méth., vol. ix, p. 634, n. 62 (1823) ; *Iolaus cippus* (part), Butler, Cat. Fab. Lep. B. M., p. 186, n. 2 (1869) ; id., Hewitson, Ill. Diurn. Lep., Suppl., p. 11, pl. Suppl. iv, figs. 39, 40, *male* (1869) ; *Camena cippus*, Moore, Proc. Zool. Soc. Lond., 1883, p. 530.

HABITAT : East Indies (*Fabricius*), Ceylon (*Butler*), Simla (*Hewitson*), Nepal (*Moore*), Bhutan, Assam.

EXPANSE : ♂, 1·4 to 1·7 inches.

DESCRIPTION : "MALE. UPPERSIDE, *both wings* brilliant blue. *Forewing* with the costal margin, the apex, and outer margin, black, the inner margin (under which there is a large tuft of dark brown hair) slightly projecting. *Hindwing* with one [two] tail, the apex dark brown. UNDERSIDE, *both wings* grey-white, highly polished, crossed beyond the middle by an indistinct brown linear band, broken into spots on the hindwing. *Hindwing* with the spot near the base of the tail and the lobe black, crowned with orange." (*Hewitson*, l. c.) FEMALE unknown.

The specimen which Mr. Hewitson described and figured must have been mutilated, as *C. cippus* has two tails of about equal length. I have seen but six specimens of this beautiful species, four from Assam, two in the Indian Museum, Calcutta, obtained at Sibsagar by Mr. S. E. Peal, and two in my own collection sent me from Jorehât by Mr. J. L. Sherwill, lastly two from Buxa, Bhutan, obtained by Mrs. Wylly. The highly-polished silvery underside of this species makes it very readily recognisable. Mr. Butler gives Ceylon as a habitat for it, which is almost certainly incorrect. Even Simla is doubtful ; I have never taken it there myself, nor have I seen a specimen from thence.

894. Camena ctesia, Hewitson. (PLATE XXVIII, FIG. 215 ♂).

C. ctesia, Hewitson, Ill. Diurn. Lep., p. 48, pl. xx, figs. 1, 2, *male* (1865) ; id., Moore, Proc. Zool. Soc. Lond., 1883, p. 530 ; id., Elwes, Trans. Ent. Soc. Lond., 1888, p. 394, n. 299, pl. viii, fig. 6, *female* ; id., Staudinger, Ex. Schmett., p. 275, pl. xcv, *male* (1888).

HABITAT : Northern India (*Hewitson*) ; Sikkim ; Jaintia Hills (*Elwes*).

EXPANSE : ♂, 1·5 to 1·8 : ♀, 1·7 inches.

DESCRIPTION : "MALE. UPPERSIDE, *both wings* brilliant ultramarine blue, all the margins broadly dark brown. *Forewing* marked by a triangular dark brown spot [on the inner margin, and a large rounded spot on the middle of the disc]. *Hindwing* with the apex dark

brown, an apical brown spot irrorated with white. UNDERSIDE, *both wings* glossy grey, with a brown spot at the end of the cell, crossed beyond the middle by a band of dark brown spots bordered with white, with a band of brown (scarcely visible on the forewing) near the outer margin. *Hindwing* with a submarginal band of brown spots, the two apical [anal] spots crowned with orange." (*Hewitson*, l. c.) FEMALE. UPPERSIDE, *forewing* differs from the male in the absence of the two black spots. Otherwise as in the male.

The males of this beautiful species are very common in Sikkim, where it occurs in June and October. As far as I am aware, it occurs nowhere else, though Mr. Elwes records it from the Jaintia Hills. Mr. Hewitson describes the markings of the upperside as dark brown. They are really very deep black, and the forewing presents the appearance of a blue area marked in the middle with a large round black spot, and another oblong one on the middle of the inner margin. I have never seen a female.

The figure shows both sides of a male specimen from Sikkim in my collection.

895. Camena deva, Moore.

Amblypodia deva, Moore, Horsfield and Moore, Cat. Lep. Mus. E. I. C., vol. i, p. 46, n. 74 (1857); *Iolaus deva*, Hewitson, Ill. Diurn. Lep., p. 42, n. 8, pl. xviii, figs. 4, 5, *male*; 3, *female* (1865); *Pratapa deva*, Moore, Lep. Cey., vol. i, p. 108 (1881); vol. iii, p. 531, pl. ccx, figs. 2, *male*; 2*a*, *female* (1887); id., Doherty, Journ. A. S. B., vol. lv, pt. 2, p. 128, n. 139 (1886).

HABITAT: Canara, Ceylon (*Moore*), Kapkot, Kumaon, 4,000 feet (*Doherty*), Dehra Dun, Malda, Sikkim, Burma, Nias Island.

EXPANSE: ♂, 1·25 to 1·50; ♀, 1·40 to 1·60 inches.

DESCRIPTION: "MALE. UPPERSIDE, *forewing* with the discoidal cell and posterior base brilliant deep blue intersected by the dark median and submedian nervures, costal margin and anterior half of the wing to beyond the posterior angle dark brown. *Hindwing* with the middle from the base brilliant deep blue, a broad anterior and narrow exterior margin of dark brown, along the exterior margin are disposed some blackish marks, a black spot at the anal angle, surrounded with whitish, abdominal margin pale brown; *tails* two, brown; *cilia* whitish. UNDERSIDE, *both wings* cream-colour, with a series of interrupted marks disposed in an undulating line across the wings, and terminating in a zig-zag manner abdominally on the hindwing. *Hindwing*, anal angle with a black spot, bordered anteriorly with red, and another of the same a short distance off on the exterior margin. FEMALE. UPPERSIDE, *both wings* paler blue, and with lighter brown margins." (*Moore*, l. c. in Cat. Lep. Mus. E. I. C.)

Mr. Doherty notes that a female taken by him in Kumaon "resembles a specimen from Sikkim [terai] in the Indian Museum, being much darker than those from Canara and the plains of Bengal, the blue on the forewing covering only the lower half of the base of the cell, paler blue from the hind margin to just above the second median nervule, broken by black veins, the margin broad and black. Hindwing bluish as in *P.* [=*C.*] *deva*, but powdered with grey scales, and interrupted by black veins, and by a submarginal line of joined dark lunules, the costal border widely dark. Owing to my ignorance of the male, I am unwilling to describe the species as new." As regards the Sikkim specimen referred to above, I do not at all think that it represents one sex of a new species, it is simply a melanoid varietal form only. As in the case of *C. cleobis*, Godart, females in this genus appear to vary a good deal in the extent of the black coloration on the upperside.

The distribution of this species is probably much more extensive than the localities given above would appear to indicate. It occurs at three distant points on the Himalayas, and two even more distant spots in the plains of India, and in Ceylon. It may be expected to turn up in all intermediate localities. In Sikkim it is very rare, Mr. Otto Möller possesses one male and four females, one of the latter was taken in November, and the one from the Terai referred to above in August. In Ceylon it has been taken at Balangada, Bamagalla, Goonambil in July, and at Wattigama in February, by Mr. Mackwood. A specimen of this species in the collection of the Indian Museum, Calcutta, has been identified as the next species by Mr. Moore, but is a true *C. deva*.

896. **Camena lila**, Moore.

Pratapa lila, Moore, Proc. Zool. Soc. Lond., 1883, p. 529, pl. xlix, fig. 9, *male*.

HABITAT: Silhet, Eastern Bengal.

EXPANSE: ♂, 1·5 [actual measurement of figure 1·8]; ♀, 1·62 inches.

DESCRIPTION: "Near to the South Indian *P.* [=*C.*] *deva*, Moore. UPPERSIDE, *both wings* with the blue of a purple tint, less metallic in lustre, and confined to a smaller space on the lower basal area, thus giving a broader black outer border. UNDERSIDE, *both wings* of a darker tint, with much more prominent transverse black sinuous line, and brownish marginal fasciæ. *Hindwing* with the anal spots also larger and broader-bordered with red. FEMALE. UPPERSIDE, *both wings* also with a broader brown border." (*Moore*, l. c.)

In the Indian Museum, Calcutta, is a male specimen from Upper Tenasserim named by Mr. Moore "*Tajuria* [sic] *lila*." It is very small, measuring only 1·45 inches in expanse, while the figure given by Mr. Moore measures 1·8 inches. It does not agree at all with Mr. Moore's description of this species, and is in fact a *C. deva*. I very much doubt *C. lila* being a distinct species, all the characters given as distinctive appearing to be very trivial.

897. **Camena icetas**, Hewitson.

Iolaus icetas, Hewitson, Ill. Diurn. Lep., p. 44, n. 14, pl. xviii, figs. 6, 7, *male* (1865); *Pratapa icetas*, Moore, Proc. Zool. Soc. Lond., 1882, p. 251.

HABITAT: India (*Hewitson*); Kangra Valley (*Moore*).

EXPANSE: ♂, 1·4 to 1·5; ♀, 1·5 to 1·6 inches.

DESCRIPTION: "MALE. UPPERSIDE, *both wings* brilliant ultramarine blue. *Forewing* with more than the outer half dark brown; the tuft of hair at the meeting of the wings black. *Hindwing* with the costal and outer margins brown. UNDERSIDE, *both wings* grey, paler towards the outer margins, crossed beyond the middle by a linear band of brown (apart where the wings meet), and by an indistinct submarginal band of rufous-brown, the outer margin rufous. *Hindwing* with the two black spots near the anal angle crowned with orange."

"Nearly allied to *I.* [=*Tajuria*] *longinus*, Fabricius, but easily distinguished from it by having the tuft of hair where the wings meet." (*Hewitson*, l. c.) FEMALE. UPPERSIDE, *both wings* black. *Forewing* with the lower basal and discal areas pale blue, rather darker towards the base of the wing. *Hindwing* with the disc more or less pale blue, some indistinct black submarginal spots, anal lobe bright ochreous as in the male. *Cilia* whitish throughout. UNDERSIDE, *both wings* as in the male.

This very beautiful species appears to be confined to the Himalayas. Mr. R. Ellis took it in Chumba, Mr. A. Grahame Young has sent many specimens from Kulu, I have taken it sparingly on Tarwa Devi, a mountain opposite Simla, about 6,000 feet elevation, Mr. P. W. Mackinnon has sent me males from Masuri taken in May, I possess a male specimen taken in Naini Tal in August, and Colonel A. M. Lang took a very large and dark female there at 6,500 feet elevation on 30th August, and lastly Mr. A. V. Knyvett has obtained three male specimens near Darjiling. These are all the certain records I possess of its capture. The female is much rarer than the male.

898. **Camena cotys**, Hewitson.

Iolaus cotys, Hewitson, Ill. Diurn. Lep., p. 43, n. 11, pl. xix, figs. 19, 20, *male* (1865); *Dacalana cotys*, Moore, Journ. A. S. B., vol. liii, pt. 2, p. 36 (1884).

HABITAT: Nepal, Sikkim, Sylhet.

EXPANSE: ♂, 1·55; ♀, 1·60 to 1·70 inches.

DESCRIPTION: "MALE. UPPERSIDE, *both wings* cerulean blue. *Forewing* with the costal and outer margins and apex broadly dark brown, the tuft of hair where the wings meet *dark brown*. *Hindwing* with the apex rufous-brown. UNDERSIDE, *both wings* rufous-grey, crossed at the middle by a broad band of white, beyond the middle by a line of dark brown, and by a submarginal obscure rufous band, the two black spots near the

anal angle [of the *hindwing*] crowned with orange, the space between the said spots brown irrorated with white."

"This species, though closely allied to *I.* [= *Dacalana*] *vidura*, Horsfield, differs from it in many respects. It has, though a male, all the appearance of a female in colour, and is without the tuft of white hair on the upperside of the forewing. On the underside it has the white band much broader." (*Hewitson*, l. c.) The white band is not so broad as in Javan specimens of the true *D. vidura*.

FEMALE. UPPERSIDE, *both wings* of a paler and less shining blue than in the male. *Forewing* with the costa and outer margin more broadly black, a white spot at the end of the cell, extending to the first median nervule. *Hindwing* with the costal margin more broadly black, the veins also black, and a series of submarginal black spots between the veins; a large prominent white spot on the middle of the costal margin. UNDERSIDE as in the male, except that the broad white discal band of the *forewing*, owing to the absence of the shining pale space on the inner margin in the male, is continued widely on to the margin.

A rare species in Sikkim, obtained once only in fair numbers by Mr. Otto Möller; and the Rev. Walter A. Hamilton has obtained it in Sylhet. It cannot belong to the genus *Dacalana* in which it has been recently placed by Mr. Moore, as it has only three subcostal nervules to the forewing instead of four, and the male does not possess the tuft of white hairs on the upperside of the forewing which is such an anomalous feature of *D. vidura*, Horsfield. *C. cotys* is nearly allied to the "*Iolaus*" *anysis* of Hewitson* from Macassar, but that species has the male tuft of hairs on the underside of the forewing black instead of dark brown, and the outer black border on the upperside of the forewing in the male is fully twice as broad. On bleaching a male specimen of *C. cotys*, I find that the grandular patch of scales on the upperside of the hindwing is placed in a different position to the patch in *C. cleobis*, Godart, and in *C. deva*, Moore; instead of occupying the triangular area formed by the bases of the subcostal nervules, and more or less extending beyond it, the greater portion of the patch is placed in the subcostal interspace above the point where the subcostal nervules originate.

899. Camena cleobis, Godart.

Polyommatus cleobis, Godart, Enc. Méth., vol. ix, p. 634, n. 61 (1823); *Iolaus cleobis*, Hewitson, Ill. Diurn. Lep., p. 43, n. 12, pl. xviii, figs. 8, 9, *male*; 10, *female* (1865); *Amblypodia hypatada*, Moore, Horsfield and Moore, Cat. Lep. Mus. E. I. C., vol. i, p. 45, n. 72 (1857).

HABITAT: Bengal (*Godart*), Northern India (*Hewitson* and *Moore*), Masuri, Malda, Dinajpur, Calcutta, Assam, Nilgiris.

EXPANSE: ♂, 1·20 to 1·60; ♀, 1·30 to 1·55 inches.

DESCRIPTION: "MALE. UPPERSIDE, *forewing* with the discoidal cell and the posterior base to posterior angle brilliant light sky-blue, rest of wing dark brown. *Hindwing* brilliant light sky-blue, with brown *cilia*, abdominal margin cream-colour. UNDERSIDE, *both wings* light creamy-brown, with a well-defined narrow undulating band of reddish-brown crossing the wings, terminating abdominally in a zig-zag manner on the hindwing; near exterior margins an indistinct line; near anal angle [of *hindwing*] two black spots, bordered anteriorly with red, and posteriorly with powdered white. Tails black tipped with white." (*Moore*, l. c.) FEMALE. UPPERSIDE, *both wings* differ from those of the male in their pale duller blue coloration, that colour being more extensive on the forewing. *Hindwing* with the costa broadly black, the outer margin bearing a series of black spots. UNDERSIDE, *both wings* as in the male.

"Variety male. With the spots near the anal angle on the underside of the hindwing entirely orange, without the black spots." (*Hewitson*, l. c.)

C. cleobis in the male is a somewhat variable species, the shade of blue in some specimens being almost as light as in the female; it is very dark and rich in a single unusually large specimen sent me from the Nilgiris by Mr. G. F. Hampson. It is probable that the range of this species is very imperfectly known. Mr. P. W. Mackinnon has taken it at Masuri in

* Ill. Diurn. Lep., p. 42, n. 9, pl. xix, figs. 17, 18, *male* (1865).

September; Mr. W. H. Irvine has captured it in considerable numbers at Bholahât in the Malda District; it is fairly common in the winter in Calcutta on the crimson flowers of the *Poinsettia*; Mr. A. V. Knyvett has taken it largely at Dinajpur in June; Mr. S. E. Peal has sent me a single specimen from Sibsagar in Upper Assam; and Mr. G. F. Hampson reports it as "rare on the slopes of the Nilgiris, 3,000-6,000 feet, October. Nilgiri specimens have the discal band on the underside not bounded outwardly by a white line, and the markings at the anal angle obsolescent as compared with North Indian specimens."

900. **Camena ister,** Hewitson.

Iolaus ister, Hewitson, Ill. Diurn. Lep., p. 43, n. 13, pl. xix, figs. 15, 16, *female* (1865).

HABITAT: India (*Hewitson*).

EXPANSE: ♀, 1·3 inches.

DESCRIPTION: "FEMALE. UPPERSIDE, *both wings* cerulean blue. *Forewing* with the apical half dark brown. *Hindwing* with the apex pale rufous-brown. UNDERSIDE, *both wings* rufous or grey-brown, crossed beyond the middle by a linear band of rufous-brown bordered outwardly with grey-white. *Hindwing* with the apical [anal] spots broadly bordered above with orange, the space between them white irrorated with black, and slightly crowned with orange."

"This, though a female, has all the characters of a male. It is closely allied to *I.* [=*C.*] *cleobis*, Godart, but differs in colour from both sexes of that species. It resembles the male of *I. cleobis* in the position of the band of the underside, less circular than that of the female. Its wings are not so broad as are those of the female, and it is without the black spots near the anal angle of the hindwing" [on the upperside]. (*Hewitson*, l. c.)

I find that every character given by Mr. Hewitson as distinguishing this species from the female of *C. cleobis*, Godart, breaks down when compared with my long series of that species. In *C. cleobis* the shade of blue on the upperside is very variable, the wings of some specimens are distinctly broader than in others, and on the upperside of the hindwing in some specimens there is a complete series of round black spots, as figured by Hewitson, sometimes only one or two are present, or all are absent. An examination of the type specimen will probably show that it is only a varietal form of *C. cleobis*.

Genus 144.—MANECA, nov. (PLATE XXVIII).

Differs from *Camena* in having the inner margin of the forewing in the male straight, not outwardly bowed, and lacking the tuft of hairs attached to the margin present in the males of that genus, but agrees with *Tajuria* in this respect; differing from the latter, however, but agreeing with *Camena*, in possessing, in the male, a glandular patch of scales on the upperside of the hindwing at the base of the subcostal nervules extending anteriorly into the costal interspace, posteriorly into the discoidal cell; outer tail one-third shorter than the inner one. Type, *Pratapa bhotea*, Moore.

The genus, as far as I know, contains but a single species, which is confined to Sikkim. The upperside of both sexes is dull slatey-blue with the outer margin black, underside bluish-white, marked by a fine discal macular blackish band. The anal lobe to the hindwing on the upperside is prominently rich ochreous, on the underside black. *Maneca* is exactly intermediate between *Camena* and *Tajuria*, it disagrees with the former in the forewing, agreeing with it in the hindwing; with regard to *Tajuria* the conditions are reversed, it agreeing with it in the forewing, differing in the hindwing. The differences in neuration are so slight that I consider it useless to describe them, especially as they would probably not hold good if every species of the genera *Camena* and *Tajuria* were examined.

901. **Maneca bhotea,** Moore. (PLATE XXVIII, FIG. 216 ♂).

Pratapa bhotea, Moore, Journ. A. S. B., vol. liii, pt. 2, p. 37 (1884).

HABITAT: Sikkim.

EXPANSE: ♂, 1·3 to 1·4; ♀, 1·5 to 1·6 inches.

DESCRIPTION: MALE. UPPERSIDE, *both wings* dull slatey-blue. *Cilia* white. *Forewing* with the costa somewhat narrowly (broadly at the outer end of the discoidal cell), the apex very broadly, the outer margin broadly and decreasingly black. *Hindwing* with a broad even outer black margin, the veins black, the abdominal margin whitish, the anal lobe prominently bright ochreous. *Tails* black ciliated with white. A glandular patch of black scales occupying the triangular area formed by the bases of the subcostal nervules, and extends ing a short distance into the subcostal interspace above. UNDERSIDE, *both wings* as in the female. "FEMALE. UPPERSIDE, *both wings* purpurascent greyish-blue. *Forewing* with the anterior margin from the costal nervure, the apex broadly, and the exterior margin violet-brown. *Cilia* grey. *Hindwing* with a marginal row of narrow violet-black spots ending in a red anal lobe-spot, a slender black marginal line; the two *tails* black with white cilia. *Cilia* greyish-white. UNDERSIDE, *both wings* glossy purpurascent greyish-white. *Forewing* with an indistinct darker bluish-grey streak at the end of the cell, and two slender lunular fasciæ along the exterior margin; a transverse discal slender prominent black broken sinuous line. *Hindwing* with a similar cell-streak and outer marginal fasciæ, the latter darkest at the anal end; a jet-black anal lobe-spot, on which are a few scarlet scales and some turquoise-blue scales along its inner border; a transverse discal zigzag slender black broken line ending upwards above the anal lobe." (*Moore*, l. c.)

Of this rare species the type female is in the Indian Museum, Calcutta; Mr. A. V. Knyvett possesses another female taken in 1883, and seven males taken by himself on the Observatory Hill in Darjiling, 7,500 feet, on 15th May, 1888. These are all the specimens of *M. bhotea* with which I am acquainted.

The figure shows both sides of a male specimen from Sikkim in my collection.

Genus 145.—MOTA, nov. (PLATE XXVIII).

WINGS, short, broad. FOREWING, *costa* evenly arched, *apex* acute, *outer margin* convex, *inner* margin slightly convex; *costal nervure* terminating opposite the apex of the discoidal cell; *first subcostal nervule* lying nearer to the costal nervure than to the second subcostal nervule; *second* subcostal with its base nearer to the origin of the upper discoidal than to that of the first subcostal; *third* subcostal rather short, arising nearer the apex of the wing than of the cell; *disco-cellular* nervules almost upright, concave, the middle disco-cellular very slightly longer than the lower; *second median* nervule arising a short distance before the lower end of the cell. HINDWING, *costa* arched at base, thence straight to apex, *outer margin* to base of upper tail at almost right angles to the costa, waved, from base of upper tail to anal angle almost at right angles again; *anal lobe* large; *abdominal margin* excavated somewhat deeply above the anal lobe, then convex; *tails* two, from the termination of the first and second median nervules, short, the upper one a little shorter than the lower; *costal nervure* arched at base, thence straight to the apex of the wing; *first subcostal nervule* originating rather close to the apex of the cell; *upper disco-cellular* nervule very slightly concave and outwardly oblique, *lower* disco-cellular straight, upright, equal in length to the upper; *second* and *third median* nervules with a common origin at the lower end of the cell; *submedian nervure* very straight; *internal* nervure short, strongly recurved. *Antennæ* short, less than half the length of the costa of the forewing. *Eyes* naked. *Palpi* long, porrect, reaching to about the level of the middle of the eyes, covered with very closely-set adpressed scales, longer in the female. *Body* moderately robust. Type, *Myrina massyla*, Hewitson.

The male of the type species lacks secondary sexual characters. The genus is restricted at present to a single species, which occurs in Bhutan and Assam.

902. **Mota massyla**, Hewitson. (PLATE XXVIII, FIG. 210 ♀).

Myrina massyla, Hewitson, Ill. Diurn. Lep., Suppl., p. 7, n. 59, Suppl. pl. iii, figs. 87, 88, *male* (1869).

HABITAT: Cherrapunji (*Hewitson*); Bhutan.

EXPANSE: ♂, 1·15 to 1·40; ♀, 1·20 to 1·55 inches.

DESCRIPTION: "MALE. UPPERSIDE, *both wings* violet-blue. *Forewing* with the costal and outer margins, and a spot at the end of the cell dark brown. *Hindwing* with two tails; the costal margin, which is broad, the outer margin and a submarginal line, dark brown; the anal lobe large and prominent. UNDERSIDE, *forewing* pale yellow-brown clouded with darker brown near the outer margin, a spot at the end of the cell and a band beyond the middle dark brown, a submarginal line of white. *Hindwing* broken into spots of different shades of brown, the costal margin and two spots touching it pale yellow, the wing irrorated with white near the outer margin, the margin pale brown, a submarginal line of white." (*Hewitson*, l. c.) FEMALE. UPPERSIDE, *both wings* purplish-black. *Forewing* with a small basal patch of violet occupying less than half the area of the wing. *Hindwing* with a fine marginal white line obsolete anteriorly (present in the male). *Cilia* alternately black and white. UNDERSIDE, *both wings* like the male.

The opposite sexes are at once distinguished by the hindwing being almost entirely blue in the male and black in the female. The markings of the underside of the hindwing are extremely complicated, but can be easily followed by an examination of the figure I have given. It is a rare species, Mr. Otto Möller possesses a single female taken in Bhutan in May, there is another in the Indian Museum, Calcutta, from Upper Assam, and the Revd. Walter A. Hamilton has sent me numerous examples of both sexes from Sylhet.

The figure shows both sides of a female specimen from Bhutan in Mr. Otto Möller's collection.

Genus 146.—APHNÆUS, Hübner. (PLATES XXV and XXVIII).

Aphnæus, Hübner, Verz. bek. Schmett., p. 81 (1816); id. (part), Hewitson, Ill. Diurn. Lep., p. 60 (1865); id., Moore, Lep. Cey., vol. i, p. 105 (1881); *Cigaritis* (part), Lucas, Explor. Alg., Zool., vol. iii, p. 362 (1849); id., Trimen, South-Afr. Butt., vol. ii, p. 146 (1887); *Spindasis*, Wallengren, Lep. Rhop. Caffr. in Kong. Sv. vet.-akad. Hand., vol. ii, p. 45 (1857); id., Distant, Rhop. Malay., p. 242 (1884); *Amblypodia* (part), Westwood, Gen. Diurn. Lep., vol ii, p. 477 (1852); idem, id., Trimen, Rhop. Afr. Austr., vol. ii, p. 226 (1866).

"WINGS, small. FOREWING, triangular; *first subcostal nervule* emitted at one-half and *second* at one-third before the end of the discoidal cell, *third* and *fifth* emitted together at a short distance beyond the end of the cell, *fourth* at two-thirds from below the third and terminating at the apex; *disco-cellular* nervules obliquely recurved, radial [*lower discoidal*] nervule from their middle; *second median* nervule close to the end of the cell, *first* median at one-half before the end; *submedian nervure* straight. HINDWING, conical; *costa* gently arched, *abdominal margin* long, *anal angle* lobed; furnished with two tails; *costal nervure* arched at base and curved to apex; *first subcostal nervule* at one-fourth before the end of the discoidal cell; *disco-cellular* nervules recurved; *discoidal* nervule from their middle; *second median* nervule from close to the end of the cell; *first* median at one-half before the end; *submedian nervure* straight, *internal* nervure recurved. BODY, short, robust; *palpi* porrect, squamose, second joint long, third short; *legs* squamose, femora slightly pilose beneath; *antennæ* with the club long, stout. *Eyes* smooth. Type, *A. orcas*, Drury," from Sierra Leone. (*Moore*, l. c.)

In *A. syama*, Horsfield, the costal nervure ends opposite to the apex of the discoidal cell, the first subcostal nervule is slightly arched upwards towards the costal nervure, but does not touch it, the base of the second subcostal nervule is nearer to the base of the first than to the base of the upper discoidal, the third subcostal is rather short, and is emitted nearer the apex of the wing than of the cell; middle and lower disco-cellular nervules very upright, of equal length, the middle slightly concave, the lower straight, the middle (there is no upper disco-cellular) meeting the costal nervure just at the point where it gives off the upper discoidal, this vein being Mr. Moore's fifth subcostal nervule, second median nervule given off from the median nervure a short distance before the lower end of the cell. Hindwing has the tails rather long, springing from the terminations of the first median nervule and submedian nervure, sometimes of equal length, often with the inner tail twice as long as the outer. The palpi in the females are longer than in the males.

LARVA fusiform, slightly hairy, constrictions between the segments not prominent, head large, twelfth segment with prominent pillar-like organs extruding tentacula. PUPA of the usual lycænid shape, smooth, rounded, humped on the middle of the thorax.

"The species of this genus have hitherto been placed in the genus *Aphnæus*, the type of which is the African *A. orcas*, Drury, which has five [four from my point of view, six from that of Moore] subcostal nervules to the forewing, and consequently is quite distinct from *Spindasis*, which has but four [three]. The late Mr. Hewitson pointed out the difference in the neuration, and though Mr. Moore, in his 'Lepidoptera of Ceylon,' describes the genus *Aphnæus* on the characters of Ceylon species, and correctly gives the type of the genus as *A. orcas*, he must have been unable to examine a specimen of that species."

"There has been, however, no necessity to make a new generic name, as Wallengren proposed his *Spindasis* for the species hitherto known as *Aphnæus natalensis*, Doubleday and Hewitson, and under that generic name the Eastern species will find their natural classification." (*Distant*, l. c.)

In this contention I think Mr. Distant is wrong. Mr. Moore correctly describes the species of the genus with three subcostal nervules to the forewing, but he takes *orcas* of Drury as the type, which has quite a different neuration; hence as he does not correctly describe his type species, which has four subcostal nervules, I think his action in fixing the type as *orcas* may be disregarded. Hübner placed two species only in his genus *Aphnæus*, viz:—*vulcanus* and *orcas*. The first should be taken as the type, and *orcas* and *hutchinsonii*, Trimen, be placed in a new genus, for which I propose the name *Aphnæmorpha**, Type, *orcas*, Drury. Wallengren's name *Spindasis* cannot be used for the species with three subcostal nervules to the forewing, as his type and only species is his *masilikazi*, which I gather from Mr. Roland Trimen's "South-African Butterflies," vol. ii, p. 147, has the normal neuration of the genus *Aphnæus*. To prevent misunderstanding, I should point out that Mr. Trimen considers that *A. natalensis*, Doubleday and Hewitson, and *A. masilikazi*, Wallengren, to be distinct species, the latter being usually placed as a synonym of the former.

Aphnæus is a large and rapidly increasing genus, of which I am quite unable to estimate the number of known species. Mr. Moore has recorded six from Ceylon, and a seventh certainly occurs there. Mr. Distant gives only one from the Malay Peninsula, several occur in the Malay Archipelago, about thirty species have been recorded from India, one or two occur in Persia and Asia Minor, and Mr. Distant says that the genus is "particularly well represented in Africa." The genus is a most compact one, and no one can fail instantly to recognise any species as belonging to it, all having a *facies* peculiarly their own. In the greater number of species, the males have the upperside more or less most beautifully glossed with rich iridescent blue, which is only visible in certain lights. In no female does this coloration occur. The male has no secondary sexual characters. In the case of species which have no blue coloration in the male, the male can be known from the female by its more pointed forewing, with the outer margin nearly straight; the latter sex having the apex more rounded, the outer margin convex, and the wings generally broader. All the species have the underside traversed by several bands, usually of a darker colour than the ground, often outwardly defined with black, and bearing a medial metallic silvery line. The anal angle of the hindwing is produced into a lobe, which is usually marked with orange on both sides, and bears two black spots. All the species have two tails, and the abdomen is striped. The flight of all the species of the genus is immensely rapid, and can barely be followed by the eye, but they seldom fly far and frequently settle with closed wings on low-growing flowers or on bushes. In Sikkim males may be taken in large numbers, sucking up moisture on damp spots in the partially dried-up beds of streams, &c. Species of the genus appear to occur almost everywhere; in the plains they are found even in the desert tracts as well as in the regions of heavy rainfall and

* Generic name and μόρφη.

profuse vegetation, in the Himalayas they occur throughout the outer ranges up to an elevation of about 8,000 feet.

Key to the Indian species of Aphnæus.

A. Male, upperside, forewing not glossed with iridescent blue.
- *a*. Both sexes, upperside, black, usually with tawny bands on forewing.
  - *a*¹. Male, upperside, hindwing (normally) not glossed with blue.
    - 903. A. VULCANUS, India (except desert tracts, Assam and Burma), Ceylon, Java.
  - *b*¹. Male, upperside, hindwing glossed with blue.
    - *a*². Both sexes, underside, red bands broad; female, upperside coloured like the male, except that the hindwing is not blue-glossed.
    - 904. A. FUSCA, Ceylon.
    - *b*². Both sexes, underside, red bands narrow; female, upperside, both wings more or less sprinkled with plumbeous scales.
    - 905. A. SCHISTACEA, Ceylon, Bombay, Nilgiris.
- *b*. Both sexes, upperside, tawny, with black bands.
  - 906. A. HYPARGYRUS, Sind, Kutch, Afghanistan.

B. Male, upperside, forewing glossed with iridescent blue.
- *a*. Male, upperside, glossed with pale iridescent blue.
  - *a*¹. Female, upperside dull dusky brown, unmarked.
    - 907. A. LILACINUS, Malda, Bombay, Central India.
  - *b*¹. Female, upperside black; forewing with lower discal area, hindwing almost throughout, irrorated with plumbeous-silvery.
    - 908. A. ABNORMIS, Nilgiri Hills.
- *b*. Male, upperside, glossed with dark bluish-purple.
  - *a*¹. Underside, forewing with mark at base of cell entire, clavate.
    - 909. A. SYAMA, Sikkim, Bhutan, Assam, Burma, Orissa, Java, Philippines.
  - *b*¹. Underside, forewing with mark at base of cell T-shaped, hook-shaped, disconnected (short streak with round spot beyond), or absent.
    - *a*². Both sexes, underside, hindwing with subbasal band entire; female, upperside, dull fuscous, the bands of the underside showing through, and with no orange markings on forewing.
      - *a*³. Bands of underside red.
        - *a*⁴. Bands distinct, prominent, on a yellow ground.
        - 910. A. LOHITA, Himalayas, Assam, Burma, Malay Peninsula, Orissa, South India, Ceylon, Sumatra, Java, Philippines.
        - *b*⁴. Bands blurred, indistinct, on a reddish ground.
        - 911. A. CONCANUS, South India.
      - *b*³. Bands on underside black.
        - 912. A. ZOILUS, Andaman Isles.
        - 913. A. ZEBRINUS, Ceylon.
    - *b*². Both sexes, underside, hindwing with subbasal band broken up into three well-separated ring-spots; female, upperside more or less sprinkled with plumbeous-silvery scales, usually with orange markings on forewing.*
      - 914. A. ICTIS, Kashmir, N. India, Ceylon.
      - 915. A. TRIFURCATA, Western Himalayas.
      - 916. A. KHURDANUS, Calcutta, Orissa.
      - 917. A. NUBILUS, Ceylon.
      - 918. A. LUNULIFERA, Sikkim.
      - 919. A. ELIMA, Western Himalayas, Karachi, Bombay, Central India.
      - 920. A. UNIFORMIS, Western Himalayas.
      - 921. A. RUKMA, Sikkim.
      - 922. A. NIPALICUS, Nepal, Sikkim.
      - 923. A. ZAFFRA, Western Himalayas.
      - 924. A. SANI, Sikkim.
      - 925. A. RUKMINI, Sikkim.

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* I am sorry I am unable to give a key to the twelve last species above given. The first seven run into each other take what distinguishing character you may, the other five are, I believe, quite distinct. The key below will suffice to distinguish the latter from one another, but I fear it is insufficient to distinguish them from all specimens, from all localities, where the first seven occur, though I believe these five species to be perfectly good

903. Aphnæus vulcanus, Fabricius.

Papilio vulcanus, Fabricius, Syst. Ent., p. 519, n. 323 (1775); idem, id., Sp. Ins., p. 114, n. 499 (1781); idem, id., Mant. Ins., vol. ii, p. 66, n. 622 (1787); id., Donovan, Ins. Ind., pl. xxxviii, figs. 3, *female* (1800); id., Herbst, Pap., pl. ccci, figs. 5, 6, *female* (1804); *Hesperia vulcanus*, Fabricius, Ent. Syst., vol. iii, pt. 1, p. 264, n. 22 (1793); *Polyommatus vulcanus*, Godart, Enc. Méth., vol. ix, p. 644, n. 101 (1823); *Aphnæus vulcanus*, Hübner, Samml. Ex. Schmett. (1816-1841); id., Butler, Cat. Fab. Lep. B. M., p. 182, n. 1 (1869); *Amblypodia vulcanus*, Horsfield, Cat. Lep. E. I. C., p. 106, n. 37 (1829); *Papilio etolus*, Cramer, Pap. Ex., vol. iii, pl. ccviii, figs. E, F, *female* (1779); *Aphnæus etolus*, Hewitson, Ill. Diurn. Lep., p. 61, n. 2, pl. xxv, figs. 3, 4 *male* (1865); *A. bracteatus*, Butler, Proc. Zool. Soc. Lond., 1883, p. 147, n. 12, pl. xxiv, figs. 10, *female*; 11, *male*; id., Swinhoe, l. c., 1886, p. 428, n. 60; *A. tigrinus*, Moore, Journ. A. S. B., vol. liii, pt. 2, p. 25 (1884); id., Swinhoe, Proc. Zool. Soc. Lond., 1885, p. 134, n. 75; id., Waterhouse, Aid, vol. ii, pl. clxiii, figs. 2, 2a, *female* (1885); *Spindasis tigrina*, de Nicéville, Journ. A. S. B., vol. liv, pt. 2, p. 49, n. 89 (1885).

HABITAT: Outer Himalayas; throughout India (except the desert tracts, Assam and Burma); Ceylon; Java.

EXPANSE: ♂, ♀, ·85 to 1·30 inches.

DESCRIPTION: MALE and FEMALE. "UPPERSIDE, *both wings* fuscous fringed with hoary, somewhat shot with violet in the male. *Forewing* with four abbreviated unequal undulate fulvous striolæ. *Hindwing* with a fulvous anal patch marked with two black ocelli, the inner one bordering on a silvery lunule. UNDERSIDE, *both wings* sulphury, with broad fulvous fasciæ, each adorned with an interrupted median silvery streak, and bordered with a sub-undulate black line. *Forewing* with the fasciæ six in number; the two apical [outer-marginal] complete, parallel with the margin, the exterior one unadorned; the third almost halved; the fourth complete, increased in the costal area by a shortened striga, and thence outwardly bifid; the fifth almost halved, broken off in the anal area; the sixth basal oblique smallest. *Hindwing* with six fasciæ, two marginal; of which the outer one is interrupted; the second complete, archedly produced to the interior margin; the third halved, joined with the second at the middle; the fourth and fifth complete, suddenly inflected in the anal region; the sixth narrow basal contiguous to the body; the anal region fulvous, bearing two most black ocellular dots."

"*A. vulcanus*, Fabricius, is prominently marked above, in the forewing of both sexes, by *four short unequal waving striolæ of a fulvous colour*: underneath, in the forewing the *third* band is short, *tending towards and touching the second band*; the *fourth* is complete, and has, *at the costal extremity, a short accessary band*, whence it appears to be *bifid* exteriorly; in the hindwing the *third* band is dimidial and loosely *united, behind the base, with the second*; but the most striking distinctive character of this species is *a deep black marginal thread; which passes in an undulated course along the edge of all the broader bands.*" (*Horsfield*, l. c.)

LARVA when full-grown appears to be rather large, considering the size of the butterfly, and is 11/16 of an inch in length. Colour pale green, the body of nearly equal width throughout; the fourth segment rather the widest, the constrictions between the segments hardly visible; the head large (much larger than in any lycænid larva known to me), black, and shining,

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and restricted to limited areas. The difficulty with the others probably arises from their wide distribution and the various climates to which they are in consequence subjected, and to their not being confined to any distinct geographical or climatic areas, whence much local and seasonal variability has arisen.

- Male, upperside, forewing glossed with iridescent blue.
  - *b*. Male. upperside glossed with dark bluish-purple; female, upperside more or less sprinkled with plumbeous-silvery scales.
    - a^1. Underside, both wings with all the markings broad.
      - a^2. Underside bright orange-yellow, bands deeper orange, not traversed by a silvery line, except at anal angle of hindwing.
        A. RUKMA, Sikkim.
      - b^2. Underside pale or dull sulphur-yellow.
        - a^3. Underside, bands darker than ground, somewhat purpurascent-yellow.
          A. NIPALICUS, Nepal, Sikkim.
        - b^3. Underside, bands concolorous with ground.
          A. ZAFFRA, Western Himalayas.
      - c^2. Underside dull Indian-red, bands darker red.
        A. SANI, Sikkim.
    - b^1. Underside, both wings with all the markings very attenuated.
      A. RUKMINI, Sikkim.

hardly hidden beneath the second segment, being quite visible from in front; the second segment marked with a large shining blackish patch which is divided in the dorsal line by a whitish line, with two similar but broader lines on each side; the third segment is anteriorly similarly marked: there is a double fine dorsal and subdorsal dark green line, and a lateral single line; the three posterior segments are marked above much as are the second and third; the twelfth segment bears two prominent blackish pillars, from the upper edge of which spring several strong bristles. When frightened, the larva protrudes a somewhat long pale green tubercle from each pillar, which bears at its apex a few fine hairs. The pillars and tubercles are larger in this species than in any other known to me except *Curetis thetis*, Drury. The mouth-like opening in the dorsal line on the posterior edge of the eleventh segment is very conspicuous under a magnifying glass. The whole body is finely shagreened, and the lateral edge and anal segment bear a fringe of numerous somewhat stout colourless hairs. The larva in Calcutta feeds on *Clerodendron siphonanthus*, R. Br. PUPA, always found in a spun-up leaf or leaves, is either green or dark brown, of the usual lycænid shape, smooth and shining, the head rounded, the thorax anteriorly slightly humped and angled at the sides, the abdomen gradually tapering posteriorly.

There is much of interest in the habits of the larvæ of *A. vulcanus*. They are most carefully tended by two somewhat small species of black ants, which Dr. A. Forel of Geneva has identified for me as *Pheidole quadrispinosa*, Jerdon, and *Cremastogaster*, n. sp. (*nicévillei*, Forel, MS.) A full dozen of these ants may be seen all at once on the body of a full-grown larva, and many others round about, so covering the larva that little else but ants is visible; the larvæ do not seem to mind the ants at all. The larvæ pass most of their time in rolled-up leaves (only issuing forth when hungry to eat the surrounding leaves, always returning to their shelters when the meal is over), several in each shelter, four being the greatest number I have seen in any one shelter. Larvæ of very different ages are to be found in the same shelter. Some of these nests are formed of two separate leaves spun together with silk, but usually the outer edges of a single leaf are spun together. When about to pupate, the full-grown larva spins a cocoon between two leaves. It is very slight and both ends are left open, it is made of white silk, the entire structure being exactly like the nests certain green spiders spin between leaves in which they lie in wait for prey. The ants which attend these larvæ make a nest in the stem of the plant on which the larvæ feed, often in a single branch of the plant. There is a only one hole to the nest, far too small for a full-grown *Aphnæus* larva to enter, but the ants take the small larvæ inside.

A. vulcanus is one of the widest spread as well as the commonest species in the genus. In Indian specimens I have seen but few males shot with blue on the upperside as described by Dr. Horsfield; very often the forewing has only three abbreviated fulvous bands on the upperside, sometimes none at all; the third and fifth fasciæ from the outer margin on the underside of the forewing are sometimes constricted in the middle, often entire. The breadth of the bands also differs very widely, and their fulvous colour is sometimes light, sometimes very dark, almost ferruginous. Two of these varietal forms have been described as distinct species, but I cannot admit them to be such, as the characters on which they are based are quite inconstant, and the specimens displaying them are not confined to any geographical region. I append their descriptions as foot-notes.* The female of *A. vulcanus* may be known from

* *Aphnæus bracteatus*, Butler. HABITAT: Mhow, October to June. EXPANSE: *Male*, 1·1; *female*, 1·2 inches. DESCRIPTION: "Allied to *A. vulcanus*, Fabricius (the male of *A. etolus*, Cramer), from which it may be distinguished as follows:—MALE. UPPERSIDE, *both wings* with the tawny bands almost as well developed as in the female of that species. *Hindwing* paler, showing the markings of the underside as dark grey bands, the tawny submarginal streak continued to apex. UNDERSIDE, *both wings* creamy-white, not sordid as in *A. vulcanus*, the bands narrower and of a darker duller red colour so as to show up the silver spangles distinctly; the fifth band on the *forewing* free, not united to the sixth as in *A. vulcanus*. *Hindwing* with the large orange anal patch wanting, so that the elbowed continuation of the fifth or submarginal band is distinctly seen; the abbreviated fourth band is also free, not united to the fifth. FEMALE. UPPERSIDE, *forewing* tawny excepting along the inner margin, and crossed by black bands corresponding with those of the underside. *Hindwing* paler than in *A. vulcanus*, showing the markings of the underside as dark grey bands; the tawny submarginal streak continued to apex and for the most part white." UNDERSIDE, *both wings* as in the male.

the male by its larger size, broader wings, all the bands on the upperside much more prominent, and sometimes to the number of six, the marginal band on the hindwing very broad at the anal angle, and extending decreasingly almost to the apex of the wing.

It is unnecessary to give particular localities for this species as it occurs almost everywhere. In the Western Himalayas it is rare on the outer ranges; it does not occur in the Eastern Himalayas or in Assam or Burma, but it is found almost throughout continental and peninsular India, except the desert tracts, and in Ceylon.

In Ceylon this species appears to be commoner than any other, judging from the large number of specimens (over eighty) Messrs. Fairlie and Green have sent me. Both Messrs. Butler and Hewitson record *A. vulcanus* from Ceylon, but Mr. Moore does not include it in his "Lepidoptera of Ceylon." Variation seems to have simply run riot in this species as exemplified by Ceylon examples. There are males entirely black above with no orange bands, and others with as many as five on the forewing. Some males are glossed slightly with iridescent blue on the hindwing, a very unusual feature in this species,* but the markings of the underside undoubtedly proclaim them to be *A. vulcanus*; lastly the markings of the underside vary from broad almost confluent deep red bands to narrow ochreous ones; the two short discal bands on the forewing are sometimes free, sometimes joined to the third and sixth bands respectively, likewise the fourth band on the hindwing is sometimes free, sometimes joined to the fifth band. I have entirely failed to split up these varying forms into distinct species, as they run one into another in every direction.

904. **Aphnæus fusca,** Moore.

A. fusca, Moore, Lep. Cey., vol. i, p. 106, pl. xli, figs. 2, 2*b*, *male*; 2*a*, *female* (1881).

HABITAT: Ceylon.

EXPANSE: ♂, 1·0; ♀, 1·2 inches.

DESCRIPTION: "MALE. UPPERSIDE, *both wings* uniform purplish violet-brown. *Forewing* with two slender indistinct orange-red streaks [these streaks vary in number from two to five]. *Hindwing* with a narrow orange-red anal patch spotted with black, [normally with a very small patch of iridescent blue seen in some lights only towards the anal angle, sometimes with the patch as large as in *A. schistacea*, Moore]. UNDERSIDE, *both wings* pale yellow, crossed by black-bordered silver-streaked red bands (similar to those in *A. schistacea*), but these are comparatively broader and more confluent. FEMALE. UPPERSIDE, *forewing* with three or four slender indistinct orange-red streaks." Otherwise as in the male. (*Moore*, l. c.)

This too is a variable species, as I find from a considerable series lent me by Mr. Fairlie from Ceylon. Normally the blue patch on the upperside of the male on the hindwing

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"The position of this species is between *A. vulcanus* and *A. actis*" [? *A. ictis*, Hewitson]. (*Butler*, l. c.)
"Fairly common here [Mhow] from October to February." (*Swinhoe.*)

In Colonel Swinhoe's collection are seven specimens of this species from Mhow. The upperside of these specimens is very variable, some of the males are not more heavily marked with tawny than are typical *A. vulcanus*. The undersides are equally variable both in coloration and the position of the bands; the fifth band in the forewing is only free in two specimens, the orange anal patch on the hindwing is present but small in some specimens, and the fourth band is barely free in two specimens, in all the rest it is joined to the fifth band. A typical example of *A. bracteatus* is quite distinct, doubtless, from a typical *A. vulcanus*, but the two species run together by innumerable gradations, and not being confined to restricted geographical regions, they cannot be kept separate.

Aphnæus tigrinus, Moore. HABITAT: Lower Bengal; Calcutta; Manbhoom; Orissa (*Moore*); Poona, October, December, May, and June (*Swinhoe*). EXPANSE: *Male*, *female*, 1·00 to 1·25 inches. DESCRIPTION: MALE and FEMALE. "UPPERSIDE, *forewing* differs from typical *A. vulcanus*, Fabricius, in the more prominent red bands, which, in the female, are conspicuously broader; there is also a slender marginal band, more or less indistinct in the male, but very distinct in the female. *Hindwing* has a red marginal band extending from above the anal lobe partly up the exterior margin, this band in the female being curved and reaching the subcostal nervure. UNDERSIDE, *both wings*, the bands are similar, but of a brighter red and with more clearly defined black borders." (*Moore*, l. c.)

"Mr. Moore has identified some Calcutta specimens of *Spindasis* [=*Aphnæus*] as this species. He has also queried other specimens of this and *S. vulcanus*, Fabricius, which, taken with the fact that *S. vulcanus* is very variable and the differences given between it and *S. tigrina* are very slight, suggests the suspicion that the latter species is at best but a doubtfully good one." (*de Nicéville*, l. c.)

Further investigation and much larger materials have convinced me that this species cannot be maintained as distinct from *A. vulcanus*.

* Colonel Swinhoe possesses a male from Mhow, which is similarly glossed, and I have one from Simla, one from Barrackpur, and two from Bangalore.

is much smaller, but in three specimens it is as large as in *A. schistacea*, and they would be that species, only the broader deeper red bands of the underside proclaim them to be *A. fusca*. The female is quite distinct from *A. schistacea*, having no plumbeous-silvery irrorations on the upperside. Mr. Fairlie's specimens are from Kandy, Patlam, and Jaffna taken in July, Mr. Hutchison records it from "Colombo, in cinnamon gardens, has a quick flight, almost invariably settles on the leaves of cinnamon plants." *A. fusca* has so far only been received from Ceylon. It is possible that the specimens I identify as *A. vulcanus* would be called *A. fusca* by Mr. Moore; in fact I greatly doubt if any true line of division can be drawn between the two species.

905. **Aphnæus schistacea**, Moore.

A. schistacea, Moore, Lep. Cey., vol. i, p. 106, pl. xli, figs. 3, *male*; 3*a*, 3*b*, *female* (1881); *A. schistaceus*, Swinhoe, Proc. Zool. Soc. Lond., 1885, p. 134, n. 77.

HABITAT: Ceylon; Sattara, September; Ootacamund.

EXPANSE: ♂, 1·2; ♀, 1·4 inches.

DESCRIPTION: "MALE. UPPERSIDE, *both wings* greyish violet-brown, basal areas slightly grey-blue. *Forewing* with three or four more or less prominent orange-yellow transverse streaks, the two middle ones often bifid. *Hindwing* with an orange-yellow anal patch and two black spots at the angle, [the lower discal area extending anteriorly to the discoidal nervule glossed with brilliant iridescent blue in some lights]. UNDERSIDE, *both wings* pale yellow. *Forewing* with a black-bordered red spot at the base of the discoidal cell, a band across the middle of the cell, a lengthened band at its end and crossing obliquely to near posterior angle, two short bands beyond, followed by a submarginal and a marginal band, each band proceeding from the costal margin, and all but the outer traversed by a silver line. *Hindwing* with a lengthened similar band extending irregularly from the costa down the abdominal margin, two transverse medial bands, an upper discal band, and a submarginal band, the latter and the outer medial band confluent at their lower ends and extending into a red anal patch; marginal line and an inner row of narrow spots, and two spots on the anal lobe black." (*Moore*, l. c.) FEMALE. UPPERSIDE, *both wings* very much paler than in the male, all the black bands of the underside showing through, the lower discal area of the forewing, the disc and especially the anal angle of the hindwing sprinkled with plumbeous-silvery scales. *Forewing* with a diffused discal orange patch about the discoidal nervules. UNDERSIDE, *both wings* with the ground-colour paler, otherwise as in the male.

In describing the female of this species Mr. Moore only notes that it differs from the male on the upperside of the forewing in the two middle orange-yellow transverse streaks being "often also joined at the lower end to the outer steaks." The general *facies* of the two sexes is however entirely different. It is a variable species, in a considerable series of both sexes before me from Ceylon, and the female from Sattara in Colonel Swinhoe's collection, I find that the extent of the orange markings on the upperside of the forewing is very variable, as also are the breadth, tone of coloration, and direction of the bands on the underside; in the forewing in some specimens the two short discal bands are parallel to one another and quite free from third and sixth bands respectively, in other specimens they are completely joined to those bands. Mr. Fairlie has taken *A. schistacea* in considerable numbers at Jaffna in Ceylon in January and July; Mr. Wade records it from "Colombo, common." Sattara and the Nilgiris are the only Indian localities that I know for this species. I received my Nilgiri specimen from Colonel Swinhoe, so he is responsible for both the Indian localities given for it. I think it highly probable that this species too will be proved to be a varietal form only of *A. vulcanus*, Fabricius.

906. **Aphnæus hypargyrus**, Butler.

Spindasis hypargyros, Butler, Proc. Zool. Soc. Lond., 1886, p. 369, n. 55, pl. xxxv, fig. 3; idem, id., Ann. and Mag. of Nat. Hist., sixth series, vol. i, p. 151, n. 63 (1888); *Aphnæus acamas*, id. (*nec* Klug), l. c., fifth series, vol. ix, p. 208, n. 12 (1882); id., Swinhoe, Proc. Zool. Soc. Lond., 1884, p. 507, n. 29; idem, id., Trans. Ent. Soc. Lond., 1885, p. 342, n. 28.

HABITAT: Sind, Kutch, Afghanistan.

EXPANSE: ♂, 1·10 to 1·45; ♀, 1·0 to 1·5 inches.

DESCRIPTION: MALE. UPPERSIDE, *both wings* fulvous, dusky at the base and on the costa. *Cilia* whitish. *Forewing* with all the bands of the underside represented above, but they are dusky-coloured, the outer and inner margins also dusky, the apex with a small suffused whitish patch, sometimes obsolete. *Hindwing* with two discal more or less interrupted dusky bands from the costa, a submarginal band (sometimes macular) from the costa to the first median nervule, the outer margin with a series of conjoined rounded black spots, sometimes a complete band, the anal lobe small, black, with a few silvery spangles. UNDERSIDE, *both wings* chalky-white, all the bands and spots ochreous outwardly narrowly defined with black and sparsely spangled with silver in the middle; a series of short linear black marks on the margin between the veins, a fine anteciliary black line. *Forewing* with a small streak at the base of the cell, a band across its middle, joined to a basal fuscous patch below the median nervure, an oblique discal band, two short bands from the costa beyond forming a V-shaped figure more or less disconnected, a submarginal catenulated band. *Hindwing* with some small basal marks, three subbasal spots in a straight line, the two upper ones sometimes joined, a discal continuous band recurved upwards to the abdominal margin, with a ring-spot on the margin anterior to the posterior end of the band, a short sinuous band beyond from the costa to just below the third median nervule, a sinuous submarginal band recurved and broken at its lower end, anal lobe with a prominent black spot, sometimes surrounded with ferruginous. FEMALE. UPPERSIDE, *both wings* somewhat darker and duller-coloured than in the male, the wings rather broader. UNDERSIDE, *both wings* as in the male.

"Allied to *S.* [=*A.*] *acamas*, Klug, and to *S. epargyros*, Eversmann. Larger; the male differing from both on the upperside in the whitish costal area of the forewing, and both sexes differing in the darker bands on both wings. Underside chalky white instead of cream-colour, all the markings darker and edged with black; the submarginal band of the hindwing is not angulated as in *S. acamas* and the hindwing itself is longer."

"This is the representative of *S. acamas* in N.-W. India; Colonel Swinhoe obtained it at Karachi and Chaman; Major Yerbury says that it is common at Campbellpore. At the time when I identified it as *S.* [=*A.*] *acamas*, we did not possess that species, and I supposed that the differences which existed in Klug's figures were due to inaccuracy of delineation. The Zeller collection has, however, now put us in possession of specimens of the true *S. acamas* and the allied *S. epargyros*, and I am able to see at a glance that here we have a series of those constant local races which constitute the only existing species in the Order Lepidoptera, but which, for that very reason, are always as thorns in the sides of those who believe that the species of Butterflies are widely distinct." (*Butler*, l. c.)

As I have only Klug's figure of *A. acamas** to guide me, I cannot form a competent opinion whether or no *A. hypargyrus* is a species distinct from it or not. Certainly the latter shows considerable variation in details in its Indian range; it is often smaller than *A. acamas*, the whitish costal area on the upperside of the forewing is quite absent in some specimens, the bands of the underside are often more or less macular, and their black edging is often obsolete, all of which are characters Mr. Butler relies on in separating the two species.

Mr. Butler records it from Chaman, South Afghanistan, also from Cambellpore in the Punjab and several places in its neighbourhood; Colonel Swinhoe records it from Karachi and Hydrabad in Sind, and from several places in South Afghanistan; and Mr. E. H. Aitken from Bhooj, Kutch. It is evidently strictly confined to the desert regions of the North-West, Afghanistan, &c.

* Described from Syria and Arabia Felix; Dr. Lang gives Syria, Persia, and the Steppes to the south and south-east of the Ural.

907. Aphnæus lilacinus, Moore.

A. lilacinus, Moore, Journ. A. S. B., vol. liii, pt. 2, p. 28 (1884); *A. æstivus*, Swinhoe, Proc. Zool. Soc. Lond., 1886, p. 428, n. 61, pl. xl, fig. 1, *female*.

HABITAT: Bholahât, Malda; Bombay; Mhow.

EXPANSE: ♂, 1·1 to 1·4; ♀, 1·2 to 1·5 inches.

DESCRIPTION: "MALE. UPPERSIDE, *both wings* brown. *Forewing* with the basal and discal areas, including the cell, pale lilacine-blue, a blackish spot at the end of the cell. *Hindwing* with the basal and medial areas pale lilacine-blue, anal lobe ochreous, with a very small silver-speckled black spot. UNDERSIDE, *both wings* pale brownish-ochreous. *Forewing* with two black rings in the cell, a band at the end of the cell dilated beneath and extending obliquely to the submedian nervure, a ringlet spot beyond the end of the cell, an upper discal inwardly oblique double ringlet spot, and a submarginal broad chain-like band, the lower ends dusky, and each traversed by a black silvery streak. *Hindwing* with very indistinct traces of darker-coloured transverse subbasal, discal, and submarginal bands, which are traversed by silvery and black streaks; anal spots minute, silver-speckled. The silvery streak traverses the middle of the markings, except on the submarginal band of both wings, where it extends along the outer border." (*Moore*, l. c.) FEMALE. UPPERSIDE, *both wings* dull brown, and of course lacking the iridescent blue colour present in the male, the wings broader, the outer margins much more convex. UNDERSIDE, *both wings* as in the male.

The type of this species is in the Indian Museum, Calcutta, and where it came from is unknown. It appears to be a very common species at Bholahât in the Malda district, whence Mr. W. H. Irvine has sent me a very fine series showing its great variation. The type specimen is moderately-prominently marked on the underside, but I possess specimens which have all the markings nearly obliterated (much as in *A. elima*, Moore) and others in which they are very prominent (much as in *A. ictis*, Hewitson); this latter is the form Colonel Swinhoe has described as below* as *A. æstivus*. This species is quite peculiar, and has no near ally. The upperside of the male being marked with pale iridescent blue is a very curious feature; the markings of the underside are perhaps nearest to those in *A. hypargyrus*, Butler. The colour of the ground on the underside varies a good deal, prominently-marked specimens having it much paler (almost primrose-yellow) than have those in which the markings are obsolete, in which latter it is ochreous inclining to brick red. Its distribution is curious, Bholahât and Mhow being the only two certain localities from which it has been recorded, but I possess a strongly-marked male specimen labelled "Bombay" received from the Bombay Natural History Society.

Since the above has been in type, Mr. Irvine has sent to me the following interesting note on his Malda experiences of this species:—"I noticed two broods of *A. lilacinus* in Malda, one occurring very numerously during the hot months after all the grass-jungle is burnt, when the butterflies are found in numbers settled on the burnt up stems of various grasses, particularly the *Saccharum spontaneum*, in the early morning, when the burnt grasses are still moist with the night's dew. A smaller brood, but of much larger size, prevails during the rains, also to be principally found amongst grasses. Both broods shew the usual seasonal changes in colour and markings, the early one being paler and more blue, with lighter markings underneath;

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* *Aphnæus æstivus*, Swinhoe. HABITAT: Mhow, May. EXPANSE: 1·4 inches. DESCRIPTION: "UPPERSIDE, *forewing* pale reddish-grey, with the bands on the underside showing faintly through the wings, marginal line brown. *Cilia* silvery-white. *Hindwing* with two brown spots on the anal angle on a slightly reddish ground. UNDERSIDE, *both wings* pale yellowish cream-colour, bands pale reddish brown with metallic marks. *Forewing* with two short bands before the middle which do not go below the cell; a median band broken in the middle, followed by a costal spot like a figure of 8 followed by two more larger spots, one touching the costa and the other below it like a figure of 8 broken off in the middle; then a submarginal and a marginal band, marginal line dark brown. *Hindwing* with an inner median and discal band, and with a submarginal and marginal band like those on the forewing; marginal line brown, and some brown marks on the abdominal margin. *Both wings* have all the bands margined with dark brown on both sides, and have a peculiar zigzag appearance in consequence of the zigzag formation of their borders." (*Swinhoe*, l. c.)

Colonel Swinhoe does not state the sex of the specimen he described and figured, but it was probably a female. In his collection is a very delapidated female specimen from Mhow.

and the rainy season brood considerably darker in every respect, with the markings underneath very much more prominent. I have observed this species nowhere else."

908. Aphnæus abnormis, Moore.

A. abnormis, Moore, Proc. Zool. Soc. Lond., 1883, p. 526, pl. xlix, fig. 4, *male*.

HABITAT: Coonoor, Nilgiri Hills.

EXPANSE: ♂, 1·5 inches.

DESCRIPTION: "MALE. UPPERSIDE, *forewing* dusky violet-brown, basal area from below the costal nervure dull greenish-grey, or, in certain lights, pale blue, the marginal line brown. *Hindwing* of the same dull greenish-grey, or light blue, with the anal lobe dull ochreous-brown. UNDERSIDE, *both wings* dull ochreous-brown. *Forewing* with three indistinctly-defined, oblique, transverse, very slightly-silvered bands, and a submarginal line. *Hindwing* with a similar medial transverse band and less distinct submarginal band." (*Moore*, l. c.) FEMALE. UPPERSIDE, *forewing* with all but the costa narrowly and the outer margin somewhat widely but decreasingly to the anal angle which are black, shining plumbeous-silvery.* *Hindwing* also shining plumbeous-silvery, the outer margin with a distinct black line, widening out into a patch at the apex, the anal lobe very dull red. UNDERSIDE, *forewing* pale reddish-brown, the inner margin broadly paler; an indistinct spot near the base of the cell, or short band from the costa to the origin of the first median nervule, an oblique band beyond from the costa to near the anal angle, not quite reaching the submedian nervure; two small spots one above the other just beyond the last band, the upper spot touching the costa, the lower one just beneath it; two other spots beyond almost forming a band at twice the distance from the two preceding spots as those are from the long discal band; a submarginal narrow macular band:—all these bands and spots of a darker colour than the ground, outwardly more or less defined by a blackish line, and sparsely centred with silver. *Hindwing* with three obscure basal spots, a long narrow straight discal band, a short band from the apex to the third median nervule, and a narrow submarginal band, these bands similar to those on the forewing. *Body* above and below concolorous with the wings, the abdomen dull red on the sides. Described from a single example from the Nilgiris in Mr. G. F. Hampson's collection.

I have not seen a male of this species. It must be very rare.

909. Aphnæus syama, Horsfield.

Amblypodia syama, Horsfield, Cat. Lep. E. I. C., p. 107, n. 39 (1829); *Aphnæus syama*, Hewitson, Ill. Diurn. Lep., p. 61, n. 3, pl. xxv, fig. 7, *male* (1865); id., Staudinger, Ex. Schmett., p. 274, pl. xcv, *male* (1888); *Spindasis syama*, Distant, Rhop. Malay., p. 243, n. 1, pl. xxiii, figs. 8, 9, *female* (1884); *Amblypodia syma*, Westwood, Gen. Diurn. Lep., vol. ii, p. 478, n. 20 (1852); *Aphnæus peguanus*, Moore, Journ. A. S. B., vol. liii, pt. 2, p. 26 (1884); *A. orissanus*, id., l. c., p. 27.

HABITAT: Sikkim, Bhutan, Assam, Burma, Orissa, Malay Peninsula, Java, Philippines.

EXPANSE: ♂, ♀, 1·1 to 1·7 inches.

DESCRIPTION: "UPPERSIDE, *both wings* fuscous clouded with hoary-whitish, obsoletely marked with the fasciæ of the underside; the anal angle of the hindwing fulvous bearing two very black dots, the exterior larger and subocellate, each inwardly increased by a small silvery streak; of the MALE with the anal [inner] area of the forewing and almost the whole surface of the hindwing shot with violet. UNDERSIDE, *both wings* sulphurous, with the intermediate black or silvery fasciæ continuous or interrupted. *Forewing* with six fasciæ, two marginal complete, the outer unadorned, the third halved to which the fourth shortest is parallel; the fifth complete tending towards the anal angle, the posterior half dilated and finally attenuated, the sixth halved reaching the fuscous band (*tæniam*) of the anal [basal] area, in addition a black basal longitudinal litura. *Hindwing* with four fasciæ parallel with the margin, the exterior one shortened, interrupted, the second arched across the anal region making for the inner margin, the third halved, the fourth complete abruptly inflected in the anal region,

* Exactly of the same shade of colour as is seen on the upperside of the females of *A. zoffra* and *A. sani*, mihi.

and greatly extended towards the inner margin; also three spots arranged in an interior series each bearing a medial silvery dot, and lastly a triangular basal spot contiguous to the body; the anal region deeply fulvous ocellated with two very black dots, the interior is orbicular, very large itself placed upon a small appendage, both inwardly increased with silvery striolæ."

"*A. syama*, Horsfield, agrees on the upperside with *A. lohita*, Horsfield; underneath the wings are sulphureous-yellow and marked with *bands of a black colour*, while the intermediate argentine strigæ are partially interrupted; in the forewing *the third and fourth bands are parallel*; *the third* is dimidial *deeply indented* on each side *in the middle*; *the fourth is greatly abbreviated*; *the fifth is complete, somewhat distended in the middle and then tapering to a point*, having a general tendency to the inner apical [anal] angle; *at the base is a short longitudinal litura*; the hindwing has *four bands*; the third, from the posterior margin, is dimidial, *the fourth forms a sudden curve in the anal region and then ascends along the whole course of the inner margin*, until it terminates at the thorax; interior of this are *three oblong marks*, individually ornamented with *a silvery dot*, disposed in a regularly transverse series, and finally at the base, a triangular spot, touching the thorax." (*Horsfield*, l. c.)

The male of this species has the blue gloss of the upperside of the same shade as in *A. lunulifera*, Moore, only more restricted, in the forewing the black apical area larger, and the black outer margin wider, in the hindwing sharply bounded anteriorly by the second subcostal nervule. It never has any ochreous markings on the upperside of the forewing as is often the case in *A. lunulifera*. *A. syama* is a very variable species on the underside, and, but for the splendid series of it in my possession from Sikkim, for which I am indebted to Mr. Otto Möller, would be a very puzzling one. Typical specimens, which are the commonest, have the ground-colour pale yellow, or sulphurous as Horsfield describes it, with the bands black. In the next step we have the ground-colour still yellow, but the bands instead of being black are reddish-black. The next step shows the ground-colour very pale yellow, the bands distinctly red. From this point there is every gradation from a very pale red to an ochreous deep red ground, the bands being much deeper red still; these specimens are typical *A. peguanus*, Moore. I sent nine of these varietal specimens from Sikkim to Mr. Moore, who returned them labelled "appear to be *A. peguanus*." He described the latter species with reference to *A. lohita*, Horsfield, from which of course it is abundantly distinct, for the club-shaped mark in the cell of the forewing on the underside proclaims its relationship to *A. syama*, and not to *A. lohita*, the latter having a mark hook-shaped. Mr. W. C. Taylor has sent me nine male and six female specimens from Orissa, no two of which agree exactly in the colour of the ground on the underside; these are the *A. orissanus* of Moore, whose description of it is appended.* The type specimen is in the Indian Museum, Calcutta. *A. syama* is a very common species in Sikkim; it occurs as typical *A. syama*, *A. peguanus*, and intermediates in the Khasi Hills, and is not rare in Burma, where all the forms that occur in Sikkim are also found. I append a description of *A. peguanus* as a foot-note.†

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* *Aphnæus orissanus*, Moore. HABITAT: Sonakhala and Bhatpara, Orissa. EXPANSE: *Male*, 1·1 inches. DESCRIPTION: "MALE, *forewing* broader and less regularly triangular than in *A. khurdanus*, Moore. [*A. khurdanus* belongs to quite a different group to *A. syama*, Horsfield, from the latter at best, *A. orissanus* is but doubtfully distinct.] *Hindwing* also less produced anally, and the exterior margin convex. UPPERSIDE, *both wings* dark brown. *Forewing* with the base slaty-blue. [This blue colouring is most brilliant and rich in certain lights, it is dull slaty in some lights only]. *Hindwing* slaty-blue, anal lobe red, spots black. UNDERSIDE, *both wings* pale ochreous-yellow, bands purple-red, similar to those in *A. peguanus*, Moore, with the marginal band black-streaked." (*Moore*, l. c.)

† *Aphnæus peguanus*, Moore. HABITAT: Magaree, Pegu. EXPANSE: 1·3 to 1·4 inches. DESCRIPTION: "MALE. Comparatively larger than *A. lohita*, Horsfield. UPPERSIDE, *both wings* similarly coloured. *Hindwing* with the anal area dull red, the large black lobe-spot replaced by a few interciliary black and silver scales. UNDERSIDE, *both wings* very pale reddish-ochreous; the bands dark red, somewhat narrower than in *A. lohita*. *Forewing* with the streak at base longitudinal, narrow, and not extending above the costal nervure, the short transverse broad end crossing the cell in *A. lohita* is here absent; the band crossing the middle of the cell is also shorter, the oblique discal and submarginal bands quite confluent at their posterior end, the inner costal band beyond the cell is short, and the next band is the longest, both being widely-separated—whereas in *A. lohita* the inner band is the longest and the two are joined externally in the middle, the submarginal band is narrower, and the marginal band very slender. *Hindwing* with the subbasal band composed of three well-separated portions; anal lobe red, with a small interciliary black-speckled streak; the submarginal and marginal band narrower, the latter being interrupted in crossing the veins." (*Moore*, l. c.)

910. **Aphnæus lohita,** Horsfield.

Amblypodia lohita, Horsfield, Cat. Lep. E. I. C., p. 106, n. 38 (1829); *Aphnæus lohita*, Hewitson, Ill. Diurn. Lep., p. 61, n. 4, pl. xxv, figs. 10, 11 (1865); id., Butler, Trans. Linn. Soc. Lond., Zoology, second series, vol. i, p. 549, n. 1 (1877); *Spindasis lohita*, Doherty, Journ. A. S. B., vol. lv, pt. 2, p. 127, n. 136 (1886); id., Moore, Journ. Linn. Soc. Lond., Zoology, vol. xxi, p. 42 (1886); *Spindasis lohita*, var. *negrita*, Felder, Verh. zool.-bot. Gesells. Wien, vol. xii, p. 487, n. 144 (1862); *Amblypodia pindarus*, Horsfield and Moore (*nec* Fabricius), Cat. Lep. Mus. E. I. C, vol. i, p. 37, n. 47 (1857); *Aphnæus lazularia*, Moore, Lep. Cey., vol. i, p. 107, pl. xli, figs. 1, 1*b*, *male*; 1*a*, *female*; 1*c*, *larvæ* and *pupæ* (1881); *Aphnæus himalayanus*, Moore, Journ. A. S. B., vol. liii, pt. 2, p. 26 (1884); *A. himalayana*, Waterhouse, Aid, vol. ii, pl. clxiii, figs. 4, 4*a*, *male* (1885).

HABITAT: Himalayas, Assam, Burma, Malay Peninsula, Siam, Orissa, South India, Ceylon, Sumatra, Java, Philippines, China.

EXPANSE: ♂, ♀, 1·2 to 1·8 inches.

DESCRIPTION: "UPPERSIDE, *both wings* dingily fuscous clouded with whitish, fringed with hoary whitish; darker in the male. *Forewing* [in the male] from the base to the middle, *hindwing* with the whole surface shining with violet; in the female with the fasciæ of the underside obsoletely streaked; hindwing moreover with a triangular fulvous anal patch, bearing two black lunules, inwardly irrorated with silver; with a larger inner subocellar lunule, placed upon a little appendage itself. UNDERSIDE, *both wings* yellow, with fulvous fasciæ, in the male reddish-purple, unmixed at the margin, each adorned with a continuous or very little interrupted median silvery streak. *Forewing* with seven fasciæ, two marginal complete, the exterior unadorned, the third and fourth shortened beyond the disc confluent, the fifth complete tending towards the anal angle, the sixth halved terminated by the fuscous band of the paler anal area, the seventh basal smallest. *Hindwing* with six fasciæ, the two exterior parallel with the margin, the second complete produced curvedly towards the interior margin, the third halved, the fourth and fifth complete abruptly inflected in the anal region, the sixth basal abbreviated; the anal region deep fulvous bearing two very black ocellate dots, the exterior between the tails oblong, inwardly increased by a silvery band, the innermost larger itself placed on a small appendage angular adorned with a short interior silvery streak."

"*A. lohita*, Horsfield, has the upperside brown, slightly variegated with gray, especially in the female, and marked with a few obsolete bands, of a deeper tint; underneath the bands, comparatively with *A. vulcanus*, Fabricius, are narrow, and wholly without any black marginal thread; the bands in the forewing are *seven* in number, besides an obsolete angular basal spot, *the third and fourth are abbreviated converging approximate or confluent behind the disc*; in the hindwing the *third is dimidial regularly transverse and without any tendency to the second marginal band*: in the character of the fourth and fifth bands this species agrees with *A. vulcanus*, while both differ decidedly from *A. syama*, Horsfield." (*Horsfield*, l. c.)

"LARVA [*A. lazularia*, Moore, from Ceylon] fusiform, head prominent; head and segments laterally minutely pilose; greyish purple-brown minutely white-speckled, each segment with a blackish transverse band and white lateral streak. Feeds on *Convolvulaceæ*. PUPA attenuated, thorax angular at the sides, purple-brown." (*Moore*, l. c. in Lep. Cey.)

A. lohita is a species which presents considerable difficulty, as in the large area which it inhabits it shows much variability. Two of these forms have been figured by Mr. Hewitson; in one the red bands of the underside are very narrow, and the two short discal ones of the forewing well-separated. I have seen no variety from India agreeing with this figure, it is possible that it may be the Sumatran form, as Hewitson gives Sumatra and India as the habitat of this species. The other figure shows all the bands very broad and of a deep red, the discal bands confluent; this appears to be the form occurring commonly at Rangoon. A form intermediate between these two extremes is the common Himalayan one. Until recently *A. lohita* was the name by which Indian specimens of this species were known, though the type was described from Java. Mr. Moore has however separated off several of these forms and described them as new species, but, as I think, on very insufficient grounds. As lately as 1886, however, he gave *A. lohita* as from Mergui, and his specimens from that locality are

now before me. I cannot find that they differ in the smallest degree from Sikkim specimens of this species which he has named *A. himalayanus* for me. From Ceylon he has described *A. lazularia*. I cannot find in his description or in specimens of the species the slightest character by which they may be separated from *A. lohita*, and Mr. Moore in his description of the species admits its variability even from such a restricted area as Ceylon. I have kept the *A. concanus* of Moore as a distinct species with considerable reluctance, the species having the ground-colour of the underside reddish-ochreous instead of yellow as in typical *A. lohita*, though Mr. Moore in describing *A. lazularia* says that this red form is a variety of that species only and occurring in the male; also *A. zoilus*, Moore, which appears typically to be confined to the Andaman Isles, and may be known by the bands of the underside being black instead of red, but Mr. Moore records this species from Mergui, and the specimen before me is perhaps nearer to *A. zoilus* than to typical *A. lohita*, as the bands are black tinged with red, and I possess a single female specimen from Ceylon which exhibits exactly the same character; lastly *A. zebrinus*, Moore, from Ceylon, which I have not seen.

A. lohita in the male has the rich blue shot on the upperside of the same shade as in *A. lunulifera*, Moore, and *A. syama*, Horsfield, and agrees with the latter in its extent. It is the commonest species of the genus in Sikkim; Mr. Otto Möller possesses specimens dated April, May, July, and October. It has a wide range, occurring throughout the Himalayas, and in Assam, in Burma, recorded from Malacca and Penang by Mr. Butler, in Orissa, the Nilgiris, and Ceylon. In the latter island it occurs at "Kandy; Hambantotte. Common. Frequents low thorny bushes. When disturbed flies round and darts about very fast, but does not go far, soon returning to settle" (*Wade*). I append the descriptions of *A. lazularia*, Moore, and *A. himalayanus*, Moore, as foot-notes.*

911. **Aphnæus concanus**, Moore.

A. concanus, Moore, Journ. A. S. B., vol. lii, pt. 2, p. 27 (1884).

HABITAT: Bombay, Canara, Orissa, Nilgiris, Shevaroy Hills.

EXPANSE: ♂, ♀, 1·25 to 1·50 inches.

DESCRIPTION: "MALE and FEMALE. Nearest to the Ceylonese *A. lazularia*, Moore [=*A. lohita*, Horsfield]. UPPERSIDE, *both wings* similar. UNDERSIDE, *both wings* pale reddish-ochreous, the bands dark purple-red. *Forewing* with the bands similar. *Hindwing* with the subbasal band composed of three portions; the medial discal and submarginal bands disposed nearer together at their costal end, the submarginal straighter, and the three more or less confluent at their anal end." (*Moore*, l. c.)

"Differs from *A. lazularia*, Moore, in having the ground-colour of the underside reddish. Found on the lower slopes of the Nilgiris, and is not uncommon." (*G. F. Hampson*).

Mr. Hampson has sent me a male specimen of this species from the Shevaroy Hills, which was named by Mr. Moore. In it the subbasal band on the underside of the hindwing

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* *Aphnæus lazularia*, Moore. HABITAT: Nilgiris, lower slopes, not uncommon (*G. F. Hampson*); Ceylon (*Moore*). EXPANSE: 1·25 to 1·50 inches. DESCRIPTION: "MALE. UPPERSIDE, *both wings* violet-brown, basal areas lazuline-blue. *Hindwing*, anal lobe with a dull orange-red patch and silver-speckled black spots. UNDERSIDE, *both wings* pale ochreous-yellow. *Forewing* with a deep purple-red silver-streaked basal triangular band, a band extending across and over the middle of the discoidal cell, one at the end, a short confluent double band beyond, a submarginal and a confluent slender marginal band. *Hindwing* with two transverse basal similar bands, two discal, a submarginal, and a slender marginal band; anal lobe bright red, black spots large and silver-bordered; no black marginal line on any of the bands. In some specimens of the male the interspaces between all the bands are nearly of the same deep red colour as the bands, this variety being represented in Hewitson's 'Diurnal Lepidoptera,' pl. xxv, fig. 10, as pertaining to *A. lohita*, Horsfield FEMALE. UPPERSIDE, *both wings* olive-brown, with indistinct ochreous-grey transverse fasciæ; basal areas slightly bluish-grey; anal lobe brighter red" [than in the male; otherwise as in the male.] (*Moore*, l. c.)

"Male dark brown shot with brilliant blue; female brown; hindwing with a yellow patch and two black spots at the anal angle; the underside white, with deep crimson silver-centred bands." (*G. F. Hampson*). The underside of a female Nilgiri specimen sent me by Mr. Hampson is yellow, not white.

Aphnæus himalayanus, Moore. HABITAT: Nepal; Sikkim. EXPANSE: *Male*, 1·3; *female*, 1·4 to 1·7 inches. DESCRIPTION: "Allied to *A. lohita*, Horsfield. MALE and FEMALE, much larger than typical Javan specimens. UPPERSIDE, *both wings* similarly coloured. *Hindwing* with the anal area duller red. UNDERSIDE, *both wings* pale creamy-yellow, the bands similar, but of a darker purple-red, all comparatively broader, the marginal band conspicuously broader." (*Moore*, l. c.)

is not composed of three portions, but is entire, as in *A. lohita*, Horsfield, but it agrees otherwise with the description of this species. I possess six male and two female specimens from Orissa which have the peculiar red ground-colour and blurred indistinct red bands which are typical of his species. It will probably be found to merge by insensible gradations into *A. lohita*.

912. **Aphnæus zoilus**, Moore.

A. zoilus, Moore, Proc. Zool. Soc. Lond., 1877, p. 588; *Spindasis zoilus*, id., Journ. Linn. Soc. Lond., Zoology, vol. xxi, p. 43 (1886); *A. lohita*, var. *zoilus*, Wood-Mason and de Nicéville, Journ. A. S. B., vol. xlix, pt. 2, p. 232, n. 43 (1880).

HABITAT: South Andaman Isles; Mergui.

EXPANSE: ♂, 1·25; ♀, 1·46 inches.

DESCRIPTION: "MALE. UPPERSIDE, *both wings* dark blue, black on the outer borders. *Forewing* with transverse bands of black. *Hindwing* with a large red anal lobe, the black spots silver-speckled. UNDERSIDE, *both wings* pale golden-yellow, bands jet-black, and traversed by a silver line. *Forewing* with seven transverse bands, a marginal line, and two short, basal, longitudinal streaks, the upper streak crossing the vein and touching the costal margin; the first and second transverse band near the base of the cell, the first joining the upper and the second joining the lower basal longitudinal streak, third crossing the end of the cell towards the posterior angle, fourth and fifth subapical and joined together, the other two marginal. *Hindwing* with six bands and a marginal line, the first or basal broken and joining the third above the red anal spot, the second entire and running into the first and third at its lower end, fourth and fifth short, sixth narrow; a short streak above anal angle; red anal lobe as above." (*Moore*, l. c.) "FEMALE, larger than the male. UPPERSIDE, *both wings* smoky brown, marked obscurely with darker bands corresponding to those of the underside. UNDERSIDE, *both wings* with the intervals between the bands wider owing to the greater breadth of the wings. In all other respects as in the male." (*Wood-Mason* and *de Nicéville*, l. c.)

"Differs from typical *A. lohita*, Horsfield, in its larger size, the differently-coloured bands beneath, and the narrowness of the marginal band on the forewing." (*Moore*, l. c.)

The only distinguishing character of any importance in the description of this species is the bands of the underside being black. They are not jet-black, but are faintly tinged with red. *A. zoilus* can be kept distinct if confined to the Andaman Isles, but Mr. Moore records it from Mergui on the strength of a specimen which is intermediate between *A. zoilus* and *A. lohita*, the bands being black, distinctly tinged with red. I possess just such a specimen from Ceylon, which I have called *A. lazularia*, Moore. Should specimens of *A. zoilus* ever be found in the Andamans with the bands distinctly tinged with red, then the species should at once be sunk as a synonym of *A. lohita*, but for the present it may be kept separate.

913. **Aphnæus zebrinus**, Moore.

A. zebrinus, Moore, Journ. A. S. B., vol. liii, pt. 2, p. 28 (1884).

HABITAT: Ceylon.

EXPANSE: ♂, 1·12; ♀, 1·25 inches.

DESCRIPTION: "MALE. UPPERSIDE, *both wings* dark brown, base dark brownish violet-blue. *Hindwing* with the anal spot large, broadly bordered with red. UNDERSIDE, *both wings* very pale ochreous, all the bands purplish-black as in *A. zoilus*, Moore. *Forewing* with the posterior border whitish, the extreme costal edge black, the bands also extending from the costal edge, basal streak long and joined to the black costal border, with a cross bar from its upper end, and a band crossing the middle of the cell (both of which join the streak below the base of the cell), the oblique discal band and the transverse submarginal band are joined together at their lower ends, and the two short upper discal bars are also joined together, the marginal band is broad with a very narrow interline between it and the submarginal band. *Hindwing* with the upper basal streak slender, the subbasal band entire and continued to the angle of the discal band above the bright red anal area; black lobe-spots large, the discal and outer bands broad. FEMALE. UPPERSIDE, *both wings* darker violet-brown

than in the male, the base of the wings dark slaty violet-blue." UNDERSIDE, *both wings* as in the male.

"Nearest allied to the Andamanese species, *A. zoilus*, Moore. Distinguished from it by its smaller size, by the bands on the forewing all starting from the extreme costal edge, by the oblique discal band and the submarginal band being broadly joined at their base, and by the marginal band being broader on both wings." (*Moore*, l. c.)

In this description Mr. Moore says that *A. zebrinus* has the bands of the underside "purplish-black as in *A. zoilus*," but in describing the latter species he calls the bands "jet-black;" in reality they are most faintly tinged with red. He also says of *A. zebrinus* that the bands of the forewing on the underside start from the extreme costal edge, thereby differing from *A. zoilus*; but with the strongest magnifying glass I cannot find any specimen of *A. zoilus* in which this character is not found. I have seen no specimen from Ceylon at all agreeing with the description of *A. zebrinus*, and unfortunately Mr. Moore makes no mention of it in his last volume of "the Lepidoptera of Ceylon," published three years after the description of the species. In the minutest particular his description of *A. zebrinus* applies to specimens of *A. zoilus*, I can discover nothing to separate the two species, but keep them distinct, as I have seen no specimen from Ceylon at all like *A. zoilus*.

In the next group seven species have been described. Individual specimens of all of them can no doubt be identified, but I have found it impossible with my large material to draw the line between them, as a perfectly graduated series from one extreme to the other can be constructed. They divide themselves primarily into two groups; in the first, which contains five species (*A. ictis*, Hewitson, *A. trifurcata*, Moore, *A. khurdanus*, Moore, *A. nubilus*, Moore, and *A. lunulifera*, Moore), the bands and spots of the underside are prominent; in the second, which contains *A. elima*, Moore, and *A. uniformis*, Moore, the bands and spots of the underside are more or less obsolete and indistinct. The next most important character seems to be the colour of the ground on the underside. In *A. ictis* it is said to be "orange-yellow," in *A. trifurcata* "deeper chrome-yellow than in *A. ictis*," in *A. khurdanus* it is "dull pale purplish brownish-ochreous," in *A. nubilus* it is "ochreous," in *A. lunulifera* it is "pale ochreous-brown," in *A. elima* it is "dull pale testaceous," and in *A. uniformis* it is "dull pale brownish-ochreous." With reference to *A. nubilus* and *A. lunulifera* I possess a specimen of each named by Mr. Moore himself in which the tint of the ground-colour on the underside is precisely similar. The only other character which appears to be important is the absence, or extent when present, of the orange patch on the upperside of the forewing. In *A. ictis* it is "large," in *A. trifurcata* it is small, "trifurcate and triangular," in *A. khurdanus* it is absent, in *A. nubilus* it is absent, in *A. lunulifera* it is a "small lunule," in *A. elima* it is somewhat large, in *A. uniformis* it is absent. From these three groups of characters one would expect to find no difficulty in identifying any specimens one met with, but the contrary is the case. The bands and spots on the underside from being very obscure gradually, step by step, little by little, become prominent; the ground-colour varies from pale ochreous to deep purplish-red, and the orange patch from being absent altogether occupies half the forewing. I have not found either that the extent of the blue iridescence on the upperside of the forewing in the male is a character of any value, in two specimens agreeing in every other particular I find it to differ. From Bholahât, in the Malda district, from Sikkim, and from Orissa, from all of which localities I have received large series of these species, I find that the specimens with prominent markings on the underside occur during the rains, and those with obsolete markings in the dry season. This agrees with what I have observed in other *Lycænidæ*, so I am almost sure that seasonal dimorphism has much to do with the variability which here undoubtedly exists. As usual I find that specimens taken at the change of the seasons (from dry to wet and from wet to dry) are intermediate in character between those taken in the middle of either season. In some localities high up in the Himalayas no doubt the species which occur are single-brooded, so only one form is met with, but in the

plains and on the lower slopes of the eastern Himalayas there is probably a constant succession of broods, and it is in such localities that the greatest extremes are met with, together with all the intermediates. To enable students the better to work out these varying forms for themselves, I have given the descriptions of all of them, quoting only in the habitat headings the localities assigned for each by competent entomologists, and with my own remarks and additional localities at foot.

914. **Aphnæus ictis**, Hewitson.

A. ictis, Hewitson, Ill. Diurn. Lep., p. 61, n. 5, pl. xxv, figs. 8, 9, *female* (1865) ; id., Moore, Proc. Zool. Soc. Lond., 1874, p. 272, n. 72 ; idem, id., Lep. Cey., vol. i, p. 107 (1881) ; id., Swinhoe, Proc. Zool. Soc. Lond., 1885, p. 134, n. 78 ; idem, id., l. c., 1886, p. 428, n. 59 ; *Spindasis ictis*, var. *ceylanica*, Felder, Verh. zool.-bot. Gesellsch. Wien, vol. xviii, p. 281 (1868).

HABITAT : Northern India (*Hewitson*) ; Kashmir, Ceylon (*Moore*) ; Ceylon (*Felder*).

EXPANSE : ♂, 1·35 inches.

DESCRIPTION : " MALE. [Judging from the figure, the specimen described and figured by Mr. Hewitson is a female.] UPPERSIDE, *both wings* rufous-brown. *Forewing* with a large medial orange space, a spot in the cell, an oblique transverse band in the middle, a single spot near the costal margin, followed by a short band of two spots, and an oblique band (which borders the brown of the outer margin and forms a triangle with the medial band), all dark brown. *Hindwing* with the space between and above the black spots near the tails orange. UNDERSIDE, *both wings* orange-yellow, with the transverse bands rufous bordered narrowly with rufous-brown, traversed by spots and lines of gold, the submarginal band composed of minute brown spots."

" A variety of this species has the orange space on the upperside of the forewing much smaller than that of the figure, and in the form of a triangle." (*Hewitson*, l. c.)

" MALE. Smaller, with the fulvous spot of the forewing smaller or wanting, the anal spot of the hindwing dull and smaller, the lower surface brownish, the fascioles of it paler and broader and with the anal spot of the hindwing this also much smaller, rounded and obsolete."

" The insect figured by Hewitson as *ictis* is a female, and not, as he specifies, a male." (*Felder*, l. c.)

Mr. Moore describes the Ceylon form as follows :—" MALE. UPPERSIDE, *both wings* purple violet-brown ; lower discal areas glossed with ultramarine-blue. *Forewing* with a small somewhat triangular orange-red spot. *Hindwing* with the anal lobe also red and spotted with black. UNDERSIDE, *both wings* pale dull sulphur-yellow, the transverse markings of a slightly darker ochreous-yellow, all with a black-bordered line and medial silvery streak ; exterior margins with a row of slender black spots. FEMALE. UPPERSIDE, *both wings* brown, basal areas greyish vinous-brown. *Forewing* with the orange spot large, broad, obliquely divided, and occupying the discal area." UNDERSIDE, *both wings* as in the male.

" Mr. Hewitson gives Northern India as the locality for *A. ictis*. His description and figures are taken from a female specimen (so labelled by him) in the British Museum Collection, which, though ticketed as from Ceylon, is not so stated by him. The variety which he indicates as " having the orange space on forewing smaller," is the Northern Indian specimen referred to as being in his own collection, and which he mistook to be the same as the Ceylon type. The Indian specimen so noted by him belongs to a distinct species, common in Upper India." (*Moore*, l. c. in Lep. Cey.)

I have before me a considerable series of this species from Ceylon, the typical locality. In all the males the orange patch on the upperside of the forewing is small, and in only one of the females is it anything like as large as is shewn in Hewitson's figure of that sex. It appears therefore that Hewitson was hardly right in calling the specimens with a small orange patch varieties of *A. ictis*, as that is the commoner form. In addition to these specimens, I possess typical ones from Mundi, in the Western Himalayas, taken by Mr. A. Grahame Young in July, August, and September, from Faizabad in Oudh, from Bholahât in the Malda District;

from Barrackpore and Calcutta (taken only during the rains), from Orissa, Bangalore, the Central Provinces, and from Mhow. Colonel Swinhoe has recorded this species from "Poona, November to April," and from Mhow from "November to July." I have seen a number of these specimens; they are all typical *A. elima*, Moore, save, perhaps, one or two, which are rather intermediate between these two species. Most probably, however, the true *A. ictis* occurs there during the rains.

915. Aphnæus trifurcata, Moore.

A. trifurcata, Moore. Proc. Zool. Soc. Lond., 1882, p. 251.

HABITAT: N.-W. Himalaya, Dharmsala (*Moore*).

EXPANSE: ♂, 1·3; ♀, 1·5 inches.

DESCRIPTION: "MALE. UPPERSIDE, *both wings* violet-brown, basal area of a more greyish-blue tint than in *A. ictis*, Hewitson. *Forewing* with the orange spot trifurcate and triangular. UNDERSIDE, *both wings* of a deeper chrome-yellow than in *A. ictis*, the silver-streaked bands similarly disposed, but all nearly dusky black throughout their breadth, the marginal slender spots more prominent. FEMALE. UPPERSIDE, *both wings* paler than in the male, basal area greyish vinous-brown. *Forewing* with the orange spot small, not larger than that of the male." UNDERSIDE, *both wings* as in the male. (*Moore*, l. c.)

I have no less than eight specimens of this species identified by Mr. Moore from Kalka in the Punjab, Orissa, and Bangalore. Every single character given above as distinctive for *A. trifurcata* breaks down in one or another of these eight specimens, and I am unable to distinguish it from *A. ictis*. Colonel Swinhoe records it from Karachi, and "several taken in the Hubb River by Captain Becher in September, 1885." Mr. G. F. Hampson reports it as "not uncommon on the lower slopes of the Nilgiris."

916. Aphnæus khurdanus, Moore.

A. khurdanus, Moore, Journ. A. S. B., vol. liii, pt. 2, p. 26 (1884).

HABITAT: Calcutta; Khurda, Orissa (*Moore*).

EXPANSE: ♂, 1·0 to 1·1 inches.

DESCRIPTION: "MALE. UPPERSIDE, *both wings* dark brown, [brilliantly glossed with violet in some lights]. *Forewing* with the base dark slaty-blue. *Hindwing* dark slaty-blue, anal lobe red, spots black. UNDERSIDE, *both wings* dull pale purplish brownish-ochreous, markings very similar to those on the underside of the same sex of *A. trifurcata*, Moore, but comparatively narrower and more regular in outline."

"This species belongs to the *lohita*-group of *Aphnæus*. On the underside the markings are extremely like those in *A. trifurcata*, but the upperside of the forewing has no red patch, as in *A. trifurcata*. The colour of the upperside is also of a much darker tint, and the outline of the forewing is comparatively more triangular." (*Moore*, l. c.)

This species (the type of which from Orissa with another specimen from Calcutta identified by Mr. Moore are before me) does not properly belong to the *A. lohita*-group; the female will probably be grey on the upperside, with an orange patch on the forewing, instead of being entirely smoky-brown, and on the underside the mark in the cell of the forewing of a different shape, while the subbasal markings of the hindwing in the male instead of being continuous as in *A. lohita* are divided into three well-separated spots. It comes therefore into the *A. ictis*-group.

This species may typically be known by the male (the female has yet to be discovered) having the forewing on the upperside unspotted and by the curious tint of the underside. I possess many specimens from Sikkim which agree exactly with the type, but by slight and almost imperceptible degrees they merge into *A. lunulifera*, Moore, on the one side, and into *A. ictis*, Hewitson, on the other. I can therefore only consider *A. khurdanus* to be a varietal form of *A. ictis*, occurring only perhaps in Eastern India (Orissa, Calcutta, and Sikkim) and even there not as a constant form, but gradually merging into *A. ictis*.

917. **Aphnæus nubilus**, Moore.

A. nubilus, Moore, Lep. Cey., vol. iii, p. 530, pl. ccx, figs. 1, 1*b*, *male* ; 1*a*, *female* (1887).

HABITAT : Ceylon (*Moore*).

EXPANSE : ♂, ♀, 1·1 inches.

DESCRIPTION : " Nearest to *A. lyzalaria*, Moore [=*A. lohita*, Horsfield]. MALE smaller. UPPERSIDE, *both wings* paler, the basal areas of a duller blue. *Hindwing* with the anal lobe reddish-brown, with ill-defined black spots. UNDERSIDE, *both wings* ochreous, bands not prominent, reddish, narrower, similarly disposed except the short upper discal band on the *forewing* being composed of two well-separated portions, the marginal line composed of indistinct narrow points. *Hindwing*, the second subbasal band composed of three short separated portions, the lowest not extending to the end of the middle band. FEMALE. Also smaller than *A. lazularia*. UPPERSIDE, *both wings* with the basal areas iron-grey. UNDERSIDE, *both wings* more red than in the male." (*Moore*, l. c.)

" Wattegama, Ceylon, May " (*Mackwood*).

This species may typically be known by the male having no orange spot on the upperside of the forewing, thereby differing from typical *A. ictis*, Hewitson. It cannot belong to the *A. lohita*-group (=*A. lazularia*, Moore), as the subbasal band on the underside of the hindwing is divided into spots, while in *A. lohita* it is entire. Mr. Fairlie possesses several male specimens which appear to be this species. These have the ground-colour reddish-ochreous rather than ochreous, much as in *A. concanus*, Moore. He has others, however, which are distinctly intermediate, the ground-colour being yellow, as in *A. ictis*, and the forewing above unspotted, as in typical *A. nubilus*. A female from Ceylon, which agrees with the males with the reddish-ochreous underside, differs from the female, as described by Mr. Moore, in having a rather small orange patch on the upperside of the forewing on the disc. I feel no doubt therefore that *A. nubilus* is a varietal form only of *A. ictis*.

918. **Aphnæus lunulifera**, Moore.

A. lunulifera, Moore, Proc. Zool. Soc. Lond., 1879, p. 140.

HABITAT : Darjiling (*Moore*).

EXPANSE : ♂, 1·2 inches.

DESCRIPTION : MALE. " UPPERSIDE, *both wings* dark greyish-blue, the borders dark brown. *Forewing* with a small ochreous-red lunule beyond the end of the cell. *Hindwing* with a dark ochreous-red anal lobe, containing two prominent black silver-streaked spots. UNDERSIDE, *both wings* pale ochreous-brown, the bands and spots defined only by prominent black lines and silver-streaked centres. *Hindwing* with the anal lobe bright vermilion, the black silver-streaked spots prominent."

" Differs from *A. ictis*, Hewitson, above in having a dissimilarly-shaped subapical mark. Underside also of a different colour. *A. elima*, Moore, also differs from this in being paler-coloured above, of a deeper colour beneath, in having the markings nearly obsolete, and in the absence of the red patch on the anal lobe." (*Moore*, l. c.)

Mr. Moore does not state the sex of the specimens of *A. lunulifera* described by him, but they were probably males, though he says nothing about the rich deep shining blue colour which pervades in certain lights the whole of the hindwing except the costa, and all but the costa as far as the median nervure, the apex widely, and the outer margin decreasingly to the anal angle (which are black) of the forewing in the male. In Sikkim specimens of the male of this species, the small ochreous-red lunule beyond the end of the discoidal cell on the upperside of the forewing is sometimes present, sometimes very small, and most often entirely absent, these latter specimens being *A. khurdanus*, Moore. I can further divide these specimens into three groups by the coloration and markings of the underside. In the first group, which in so far appears to be the typical one, the anal lobe of the hindwing has a prominent bright vermilion patch, the ground-colour is pale ochreous-brown, and all the markings are prominent.

This form runs into typical *A. ictis*, Hewitson. The second group agrees with the first in the prominence of the markings on the underside, and in the vermilion anal lobe, but the ground-colour is reddish-ochreous. The third group has all the markings obscure and partly obliterated, the ground-colour entirely deep red, and the vermilion colour of the anal lobe obsolete. In the large series of specimens of this species from Sikkim in Mr. Otto Möller's collection, I find that these three groups almost run into one another, and these characters cannot be used to split up the specimens into distinct species. The female of course lacks on the upperside the blue gloss altogether, the base of the wings is sprinkled with plumbeous-silvery scales, and there is a moderate-sized orange patch on the forewing.

Typical *A. lunulifera* appears to be confined to Sikkim, but I possess specimens from Dehra Dun, from Bholahât in the Malda District, from Barrackpore near Calcutta, from Pachmarhi in the Central Provinces, and from Bangalore in South India, which differ only from typical specimens in the ground-colour of the underside being rather less deep red and more inclined to ochreous, these specimens being matched exactly by other aberrant specimens from Sikkim. A perfectly graduated series can be made from typical *A. lunulifera* to typical *A. ictis*. In Sikkim it occurs at any rate in April and July. The variations in the markings and coloration are not apparently due to seasonal causes.

919. **Aphnæus elima**, Moore.

A. elima, Moore, Ann. and Mag. of Nat. Hist., fourth series, vol. xx, p. 51 (1877); idem, id., Proc. Zool. Soc. Lond., 1882, p 251; id., Butler, l. c., 1883, p. 147, n. 11; id., Swinhoe, l. c., 1885, p. 134, n. 74; idem, id., l. c., 1886, p. 428, n. 58.

HABITAT: Manpuri, N.-W. India; Kangra Valley (*Moore*); Mhow, December (*Butler*); Poona, November to May, Mhow, November, December, January, and March (*Swinhoe*).

EXPANSE: ♂, 1·12; ♀, 1·25 inches.

DESCRIPTION: "Wings acute at apex, anal lobe prominently distended. MALE. UPPERSIDE. *both wings* brown, posterior half of forewing and middle of hindwing glossed with smalt blue. *Forewing* with a not very prominent subapical reddish patch, in which are two brown spots. *Hindwing* with the abdominal margin pale testaceous, anal lobe reddish testaceous. UNDERSIDE, *both wings* dull pale testaceous, transverse spots and bands very pale, being defined only by outer margins, each traversed by a silver streak, no marginal row of dots. FEMALE. UPPERSIDE, *both wings* brown. *Forewing* with a large triangular maculated red patch. *Hindwing* with reddish discal streak and anal lobe." UNDERSIDE as in the male.

"Most nearly allied to *A. ictis*, Hewitson, from which it may be known by the less prominent apical red patch [on the upperside of the forewing], the difference in colour, and less apparent markings of the underside." (*Moore*, l. c.)

"Not common here (Mhow); taken in November, December, and January: five specimens in all; Poona, November to May." (*Swinhoe*).

The obsolescence of all the markings of the underside makes this species an easy one to identify. I possess specimens from Dehra Dun, Bholahât, Sikkim, Orissa, the Central Provinces, the Satpuras, Bombay, Sirur, and the Nilgiris. Colonel Swinhoe correctly records it from Mhow and Poona, and he possesses typical specimens from Umballa. Every specimen bearing a date in his collection and my own has been taken in the dry season, so I have not the smallest doubt that *A. elima* is a dimorphic seasonal form of *A. ictis*, more especially as I possess many intermediate specimens which cannot be assigned typically to either species.

920. **Aphnæus uniformis**, Moore.

A. uniformis, Moore, Proc. Zool. Soc. Lond., 1882, p. 251.

HABITAT: Mount Meru, Wurdhan (*Moore*).*

EXPANSE: 1·42 inches.

* Mr. A. Grahame Young informs me that this locality should be "Meru Wurdwan, Kashmir."

DESCRIPTION. MALE. "*Forewing* comparatively narrower and more acutely pointed at the apex than in *A. trifurcata*, Moore. *Hindwing* shorter, but longer hindwards, and the exterior margin even and less convex anteriorly. UPPERSIDE, *both wings* dull bluish-brown. *Forewing* unmarked. *Hindwing* with an indistinct dull ochreous anal spot speckled with grey and black. UNDERSIDE, *both wings* dull pale brownish-ochreous, the transverse bands nearly obsolete, being indicated by very slender indistinct silvery-speckled lines. *Hindwing* with the anal lobe black-spotted." (*Moore*, l. c.) FEMALE. UPPERSIDE, *both wings* brown, the basal areas sprinkled with plumbeous-silvery scales. *Forewing* with a moderate-sized discal orange patch, bearing two or more fuscous spots. *Hindwing* with the anal lobe dull red. UNDERSIDE, *both wings* as in the male.

In the above description, Mr. Moore does not state the sex he is describing, but it must have been a male. Its nearest relation is *A. elima*, Moore, certainly not *A. trifurcata*, that species having very prominent markings on the underside.

On the 13th June, 1879, I obtained a good series of this species, all at rest on white thistle heads, at Mogul Maidan, Kashmir. A male sent to Mr. Moore for identification was returned marked "*A. uniformis*," a female "*A. elima*," showing how close these two species must be, as their describer identifies as distinct, specimens of opposite sexes of evidently one species taken on the same day in one spot. It is probable that in Kashmir this species is single-brooded, the hot weather being too short to allow of a succession of generations with corresponding variations to mature. To deal with a species like this presents great difficulties from a systematic point of view. It is probably quite constant where it occurs, though hardly distinguishable from some specimens of *A. elima*; the latter species again running by insensible gradations into typical *A. ictis*, these variations being probably due to season and weather. A bi-specific nomenclature would seem to be the only way out of the difficulty, and this species might stand as *Aphnæus* (*ictis*) *uniformis*.

921. **Aphnæus rukma**, de N. (PLATE XXV, FIG. 145 ♂).

A. rukma, de Nicéville, Journ. A. S. B., vol. lvii, pt. 2, p. 281, n. 10, pl. xiv, fig. 6, *male* (1888).

HABITAT: Sikkim.

EXPANSE: ♂, 1·3 inches.

DESCRIPTION: "MALE. UPPERSIDE, *forewing* black, the base and lower discal area slightly iridescent deep blue of the exact shade and extent of *A. nipalicus*, Moore; a small ferruginous spot near the base of the second discoidal interspace. *Hindwing* with the costal margin broadly, outer margin narrowly black, abdominal margin pale fuscous, the rest of the wing iridescent deep blue; anal angle ferruginous, bearing two black spots sparsely marked with metallic silvery scales; *tails* black, tipped with white. UNDERSIDE, *forewing* pale chrome-yellow, the inner margin below the median nervure fuscous, beyond and below the first median nervule whitish; a very short black streak from the base of the wing touching the costal nervure posteriorly; a small oval spot beyond in the discoidal cell; another crossing the cell from the base of the first median nervule to the costa; an oblique discal band from the middle of the costa towards the anal angle; a figure of eight beyond, parallel to the discal band and touching the costa; two oblong spots beyond touching in the middle, not reaching the discal band, but forming with it a disconnected Y-shaped figure; a submarginal catenulated band, ending posteriorly in two black spots in the submedian interspace—all these spots and bands of a darker chrome-yellow than the ground, broadly outwardly defined with black; a marginal fine black line more or less broken up into spots. *Hindwing* pale chrome-yellow; the spots and bands arranged as usual, coloured as in the forewing, the discal and submarginal bands where they are recurved to the abdominal margin marked with metallic silvery lines; the anal lobe marked much as on the upperside, but the ferruginous colour more inclined to orange."

"The type is unique in the collection of Mr. Otto Möller. The species is nearly allied to *A. nipalicus*, Moore, which also occurs in Sikkim, from which the male does not differ on the upperside, but may be known on the underside by having none of the spots and bands of the forewing traversed by a silvery line." (*de Nicéville*, l. c.)

The figure shews both sides of the male type specimen from Sikkim in the collection of Mr. Otto Möller. The coloration of the underside is of a much richer and darker shade than shewn in the figure.

922. **Aphnæus nipalicus**, Moore.

A. nipalicus, Moore, Journ. A. S. B., vol. liii, pt. 2, p. 27 (1884).

HABITAT: Nepal, Sikkim.

EXPANSE: ♂, 1·50; ♀, 1·37 inches.

DESCRIPTION: "MALE. UPPERSIDE, *both wings* dusky violet-brown, the lower basal and discal areas dark slatey-blue. *Hindwing* with the anal lobe red, the black spots speckled with silvery-white scales. UNDERSIDE, *both wings* dull sulphur-yellow, the bands of a slightly darker somewhat purpurascent-yellow. *Forewing* with an oblique oval black ring near the base of the cell; a black-lined bar across the middle of the cell from the costal edge; an oblique discal band from the costal edge, broken, but not disconnected, at the lower end of the cell; a short upper discal bar; and two shorter subapical bars beyond [? in one straight line]; a submarginal band and a slender broken lunular marginal line; all but the last traversed by an extremely slight silvery line; beneath the cell is a dusky brown fascia, and a dusky streak also is at the end of the submarginal band. *Hindwing* with a small spot at the base of the cell, three transverse subbasal oval black rings, a transverse medial band, broken at the lower end, then bent upwards to the abdominal margin, and ending in a small ring-spot, and an outer discal upper band, a narrower submarginal band broken above the anal angle and bent upwards, all traversed by an extremely slight silvery line; anal lobe-spots large, black, surmounted by bright scarlet. FEMALE. UPPERSIDE, *both wings* paler dusky olive-brown. *Forewing* with a subapical darker spot bordered on each side by red, the basal area below the cell slatey-grey. *Hindwing* with the lower basal area slatey-grey, anal lobe as in the male. UNDERSIDE, *both wings* as in the male."

"Nearest allied to *A. lunulifera*, Moore." (*Moore*, l. c.)

I have not seen this species. It is evidently very close to *A. rukma*, mihi, but in the latter in the male the ground-colour is bright yellow, none of the bands on the forewing are traversed by silvery lines, and in the hindwing there are two black spots at the base, one above the other. In the Indian Museum, Calcutta, is a female specimen from Sikkim, which Mr. Moore has identified as *A. nipalicus*, but it can be at once distinguished from that species by the absence of the silvery lines in the bands on the underside; the specimen is, in fact, my *A. sani*.

923. **Aphnæus zaffra**, n. sp. (PLATE XXVIII, FIG. 217 ♀).

HABITAT: Western Himalayas.

EXPANSE: ♂, ♀, 1·4 to 1·7 inches.

DESCRIPTION: MALE. UPPERSIDE, *both wings* black. *Forewing* with all but the costa and outer margin narrowly rich iridescent sapphire-blue, usually with a small elongated orange spot beyond the discoidal cell in the second discoidal interspace. *Hindwing* almost entirely suffused with blue in certain lights as in the forewing, a rather small ochreous anal lobe, marked with two small black spots irrorated with silvery scales; *tails* black, tipped with white. UNDERSIDE, *both wings* pale primrose-yellow, the bands and spots of the colour of the ground, being simply defined by narrow black lines, and bearing a medial narrow more or less obsolete silvery line. *Forewing* with a fine short black line at the base of the cell touching the subcostal nervure, a ring-spot beyond, a short bar from near the costa crossing the middle of the cell to the median nervure, an oblique discal band, obsolete posteriorly,

its lower portion posterior to the third median nervule slightly shifted outwardly; a figure of eight beyond, two invariably well-separated spots beyond again, a catenulated submarginal band, a marginal series of short lines between the nervules; the base of the inner margin dusky black. *Hindwing* with a small black spot at the base of the cell, three oval ring-spots beyond arranged in a straight line, a discal straight band, broken posteriorly, then bent upwards to the abdominal margin, with a round ring-spot above it, an outer upper discal band from the costa to the third median nervule, a submarginal narrow band, broken above the anal angle, then continued obliquely to the abdominal margin, below the broken portion is a small oblong orange-yellow patch not nearly reaching the outer margin, a broken marginal line as in the forewing, the anal lobe bearing two prominent black spots. *Body* concolorous with the wings above, black banded with pale yellow below. FEMALE. UPPERSIDE, *forewing* dusky black, with a moderate-sized oval orange discal patch bearing two round black spots placed obliquely, the lower discal area and basa area extending into the cell slightly bright plumbeous-silvery. *Hindwing* with the base and disc streaked with plumbeous-silvery between the veins.

Described from six males and five females, which have been taken by Mr. A. Grahame Young in the Kulu Valley in June, by Mr. P. W. Mackinnon at Masuri in May, and by Colonel A. M. Lang, R. E., at Bhowali, 5,600 feet, Kumaon, in May, and at Naini Tal, 5,500 feet, also in May; also at Saria Tal, 5,600 feet, and at Sât Tal, 4,500 feet, both near Naini Tal. All these specimens are remarkably constant; the pale yellow colour of the underside with concolorous bands should enable it to be easily recognised. From the description of *A. nipalicus*, Moore, it appears to be very near to that species, but the bands are not slightly darker than the ground, and of a somewhat purpurascent-yellow colour as in that species.

The figure shews both sides of the female type speciemen from Masuri in my collection.

924. **Aphnæus sani**, de N. (PLATE XXV, FIG. 146 ♀).

A. sani, de Nicéville, Journ. A. S. B., vol. lvii, pt. 2, p. 282, n. 12, pl. xiv, fig. 7, *female* (1888).

HABITAT: Sikkim, Bhutan.

EXPANSE: ♂, ♀, 1·5 inches.

DESCRIPTION: "MALE. UPPERSIDE, *both wings* exactly as in *A. rukma*, mihi, but the ferruginous spot beyond the discoidal cell rather larger. UNDERSIDE, *both wings* differ from that species in the ground-colour being pale cinnamon-red instead of pale chrome-yellow, all the bands and spots the same, but, instead of being filled in with dark chrome-yellow they are dark cinnamon-red. FEMALE. UPPERSIDE, *forewing* black, with an oval suffused ferruginous patch on the disc marked in the middle by a black spot; the lower discal and basal areas metallic plumbeous-silvery. *Hindwing* dull fuscous, sparsely sprinkled with plumbeous scales. UNDERSIDE, *forewing* very pale chrome-yellow, the inner margin broadly whitish; the figure of eight and two spots beyond much smaller than in *A. rukma* and quite divided. *Hindwing*, ground-colour dull pale cinnamon, marked as in the male."

"This species is known to me by three male specimens almost exactly alike in the collection of Mr. Otto Möller, one of which was taken in Sikkim on 11th July, 1884, another is without date, and the third was taken in Bhutan in April, 1887, also from a single female in the collection of Mr. G. C. Dudgeon, also taken in Sikkim, on 6th May, 1887."

"Whether *A. nipalicus*, *A. rukma*, *A. rukmini* and *A. sani* are four distinct or one protean species must remain undecided for the present. The ground-colour of *A. nipalicus* and *A. rukma* is the same on the underside, *viz.*, yellow, but the former has the bands and spots marked with a silvery line which the latter has not. The colour of *A. rukmini* is dull Indian-red or stone-colour, the bands marked with a silvery line; of *A. sani* cinnamon-red, with no silvery line. By these characters, as far as my specimens go, the various species can be readily distinguished." (*de Nicéville*, l. c.)

The figure shews both sides of the type female specimen from Sikkim in the collection of Mr. G. C. Dudgeon. I have seen many additional specimens of this species, all from Sikkim, since the description above was published, some of which were taken in October.

925. **Aphnæus rukmini**, de N. (PLATE XXV, FIG. 147 ♂).

A. rukmini, de Nicéville, Journ. A. S. B., vol. lvii, pt. 2, p. 282, n. 11, pl. xiv, fig. 8, *male* (1888).

HABITAT : Sikkim.

EXPANSE : ♂, 1·35 and 1·60 inches.

DESCRIPTION : "MALE. UPPERSIDE, *forewing* as in *A. rukma*, mihi, but lacks the ferruginous spot. *Hindwing* as in *A. rukma*, but the anal lobe dull ochreous instead of ferruginous. UNDERSIDE, *both wings* pale reddish-ochreous or stone-colour. *Forewing* with the inner margin paler, the usual blackish patch towards the base of the inner margin ; all the markings much reduced and attenuated ; the short streak at the base of the cell and ring-spot beyond entirely absent in one specimen, but present in the other, the other bands and spots sparsely marked with silvery as in *A. nipalicus*, Moore. *Hindwing* also with all the bands highly attenuated and marked with a silvery line ; a very small ferruginous-orange spot only on the anal lobe."

"The species is known to me by two male specimens in the collection of Mr. Otto Möller, one of which was taken on 8th May, 1888. Except in size, they are nearly exactly alike." (*de Nicéville*, l. c.) Since the above was published, I have seen several more specimens of this species from Sikkim in the collections of Messrs. Knyvett and Dudgeon.

The figure shews both sides of the type male specimen from Sikkim in the collection of Mr. Otto Möller.

Genus 147.—TAJURIA, Moore. (PLATES XXV and XXVIII).

Tajuria, Moore, Lep. Cey., vol. i, p. 108 (1881) ; id., Distant, Rhop. Malay., p. 244 (1884) ; *Cophanta* and *Remelana*, Moore, Journ. A. S. B., vol. liii, pt. 2, pp. 35 and 37 (1884).

"Differs from *Pratapa*, Moore [= *Camena*, Hewitson], in the absence in the male of both the tuft of hair on the forewing and the glandular patch on the hindwing. FOREWING, broader and more regularly triangular in form ; venation similar. HINDWING, comparatively narrower and more produced hindwards ; *discoidal cell* broader, the *subcostal* and *median nervules* emitted further from the base. Type, *T. longinus*, Fabricius." (*Moore*, l. c.)

"FOREWING, subtriangular ; *costal margin* moderately convex, apex subacute, *outer margin* moderately convex, *inner* margin slightly sinuate ; *costal nervure* terminating on the costa nearly opposite the end of the discoidal cell ; *first subcostal nervule* emitted near the middle of the cell, *second* subcostal about midway between the first and third, *third* subcostal a little before the end of the cell, *third* and *fourth* subcostals bifurcating at about or a little beyond half the length of the third ; *disco-cellular* nervules suberect ; *third median* nervule emitted at the end of the cell, *second* median nearer to the third than to the first, *first* median emitted at about two-thirds from the base. HINDWING, subovate ; *costal margin* obliquely convex to the apex ; *apex* rounded ; *posterior margin* obliquely rounded, prolonged in a more or less distinct angle at the apex of the second median nervule, and with two slender *tails* situated respectively at the apices of the first median nervule and of the submedian nervure ; *costal nervure* extending to the apex of the wing ; *subcostal nervules* bifurcating at about one-third before the end of the cell ; *third* and *second median* nervules with an apparently common origin a little before the end of the cell, *first* median a little beyond the middle of the cell ; *submedian nervure* slightly curved outwardly, *internal* nervure strongly curved inwardly. BODY robust ; *palpi* porrect, the apex of the second joint not reaching the upper margin of the eyes."

"This genus, proposed by Mr. Moore, is evidently—from the description—closely allied to *Pratapa* of the same author, a genus which I have had no opportunity to examine. The only

structural differential characters given are in respect to the hindwing, which has the 'cell broader, the subcostal and median branches emitted further from the base.'" (*Distant*, l. c.) With regard to this structural difference between *Tajuria* and *Pratapa*, it is one I am unable to detect in bleached specimens of both sexes of the types of both genera; but in my opinion the secondary sexual characters which are present in the males of *Pratapa* (= *Camena*) and wanting in those of *Tajuria*, are very important structural characters, and had they been wanting in *Camena* I should certainly and without hesitation have run the two genera into one.

Mr. Moore has described the genera *Cophanta* and *Remelana* as below* for certain species which appear to me to be unworthy of generic rank. In *Cophanta* he places two species only, *illurgis*, Hewitson, and *maculata*, Hewitson; in *Remelana* two species are also included, *jangala*, Horsfield, and *travara*, Hewitson. In both these genera the neuration is the same practically as in *Tajuria*, and the other differential characters are not of much importance. I also include in *Tajuria* several species which Mr. Moore places in the highly aberrant genus *Silhon*, Hübner. As arranged here, I think *Tajuria* presents a well-defined and easily-recognisable group of species, all of which are more or less blue or purple on the upperside in the male, and usually in the female also, all have two moderately-long thin tails of about equal length to the hindwing, and none of the males have a tuft of hairs on the inner margin of the forewing or a glandular patch near the costa of the hindwing. One species (*T. melastigma*, mihi) is aberrant in having a patch of scales differently-formed from those on the rest of the wing in the middle of the disc of the forewing in the male, but in other respects, as far as I can judge without bleaching a specimen, it seems to be normal. In perfectly fresh specimens of the male of *T. jangala*, Horsfield, this patch is also faintly visible.

I am unable to give the distribution of the genus with accuracy. It is probably oriental only, occurring almost throughout India (except the desert tracts), in Ceylon, and the Andaman Isles, throughout Burma and the Malay Peninsula and Islands. As may be seen from their structure, the butterflies of this genus have a swift flight; they settle on trees and bushes, and seem to be but little attracted by ordinary flowers, though I have found *Poinsettia* when in bloom to be much frequented by two species in Calcutta. With the exception of *T. longinus*, Fabricius, and *T. jangala*, Horsfield, all the species of the genus are rare, many of them extremely so. This may doubtless partly be accounted for by their habits of settling on trees and bushes out of sight and often out of reach, and not frequenting flowers. *T. jangala* comes down to the water to drink, so in Sikkim at any rate the males are often caught. The transformations of *T. longinus*, Fabricius, only are known, and will be found described below. As portrayed by Mr. Moore it shares with *Spalgis epius*, Westwood, the peculiarity of having its pupa hanging free as in the family *Nymphalidæ*.

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* Genus *Cophanta*, Moore, Journ. A. S. B., vol. liii, pt. 2, p. 35 (1884). "FOREWING, broad, *costa* arched, *exterior margin* slightly convex, *posterior* margin nearly straight; *discoidal cell* broad, extending to half length of the wing; *costal nervure* extending to half the margin; *first subcostal nervule* emitted at two-fifths and *second* at one-fourth before the end of the cell, third bifid at nearly two-thirds from the base; *disco-cellular* nervule slender, slightly bent outwards in the middle; *discoidal* nervule from its angle; *first median* nervule at one-third and *second* median from close before the end of the cell; *submedian nervure* straight. HINDWING, broad, *costa* abruptly arched at the base, *apex* convex, *exterior margin* oblique and sinuous from the second median nervule, *anal angle* lobed, with a slender *tail* from first median nervule and another from submedian nervure; *costal* and *subcostal nervures* joined together for a short distance at the base, the costal much arched from above the juncture, and extending to the apex; *first subcostal nervule* emitted at one-fifth before the end of the cell; *disco-cellular* nervule outwardly oblique and bent outwards at the middle; *discoidal* nervule from its angle; *discoidal cell* broad, extending to nearly half the wing; *first median nervule* at one-third and *second* median from immediately before the end of the cell; *submedian nervure* straight; *internal* nervure recurved. BODY, short, thick; *palpi* porrect, second joint long, extending half length beyond the eyes, third joint slender, slightly fusiform, nearly half length of the second; *antennæ* short, stout, with a gradually-thickened club; *legs* short. Type, *C. illurgis*, Hewitson." (*Moore*, l. c.)

Genus *Remelana*, Moore, Journ. A. S. B., vol. liii, pt. 2, p. 37 (1884). "MALE. FOREWING, less triangular than in *Tajuria* (*T. longinus*, Fabricius), the *costal margin* more abruptly arched at the base, *exterior* margin slightly convex, *posterior angle* rounded. HINDWING, broader and less produced hindwards, *costa* less arched at the base, very convex externally; with a slender *tail* from the end of the first median nervule and another from the submedian nervure; *abdominal margin* short. *Palpi* shorter than in *Tajuria*, second joint stouter, and third joint longer; *antennæ* shorter, tip shorter and more regularly clavate. *Venation* similar to *Tajuria*. Type, *R. jangala*, Horsfield." (*Moore*, l. c.)

Key to the Indian species of Tajuria.

A. Both sexes, underside, ground-colour white or grey.

a. Both sexes, underside, outer third of both wings red-brown.

*a*¹. Both sexes, underside, hindwing with anal lobe and subanal black spot narrowly defined outwardly with orange; red-brown outer third of wing not reaching anal region.

926. T. INDRA, N.-E. India, Orissa, South India.

*b*¹. Both sexes, underside, hindwing with anal lobe and subanal black spot broadly defined outwardly with orange, red-brown outer third of wing continued broadly and evenly across anal region to abdominal margin.

927. T. TARPINA, South Andaman Isles.

b. Both sexes, underside; both wings entirely white or grey.

*a*¹. Both sexes, underside both wings with numerous large rounded black spots nearly evenly spread over the entire surface, no discal line.

928. T MACULATA, Sikkim, Assam.

*b*¹. Both sexes, underside, both wings crossed by a narrow discal line.

*a*². Both sexes, upperside, forewing with outer black margin extending along inner margin towards base of wing.

*a*³. Both sexes, underside, both wings with disco-cellular marks large, no black spot near costal base of hindwing.

929. T. ILLURGIS, Masuri, Sikkim.

*b*³. Both sexes, underside, both wings with disco-cellular marks narrow and linear, a round black spot near costal base of hindwing.

930. T. ILLURGIOIDES, Naini Tal, Sikkim.

*b*². Both sexes, upperside, forewing with outer black margin not extending along inner margin towards base of wing.

*a*³. Both sexes, underside, forewing with macular discal line indistinct or obsolete.

*a*⁴. Male, upperside, both wings brilliant metallic cyaneous blue.

931. T. LONGINUS, Outer Himalayas, Plains of India (except desert regions), Ceylon, Burma, Malay Peninsula, Java.

*b*⁴. Male, upperside, both wings dull non-metallic slatey blue.

932. T. JEHANA, Masuri, Plains of India (except desert regions), Ceylon.

*b*³. Both sexes, underside, forewing with continuous discal line prominent.

*a*⁴. Discal line straight, reaching costa, increasing in width anteriorly.

933. T. DIÆUS, Himalayas, Assam.

*b*⁴. Discal line slightly curved, not reaching costa, of equal width throughout.

934. T. ALBIPLAGA, Sikkim.

B. Both sexes, underside, ground-colour brown or red of some shade, or yellow, never white or grey.

a. Male, upperside; forewing with blue or purple discal and basal patches.

*a*¹. Both sexes, underside, both wings dull pinkish or hoary fuscous.

*a*². Male, upperside, forewing with large quadrate shining black sexual mark on disc; both sexes, underside, hindwing with no large yellow patch on anal region.

935. T. MELASTIGMA, Sikkim, Khasi Hills, Burma, Nilgiris.

*b*². Male, upperside, forewing with no sexual mark; both sexes, underside, hindwing with large yellow patch on anal region.

936. T. MANTRA, Burma, Malacca, Nias, Celebes, Macassar?

*b*¹. Both sexes, underside, both wings usually ferruginous-brown, sometimes dark ochreous, rarely clear chrome-yellow; with narrow discal line.

937. T. JANGALA, Sikkim, Assam, Burma, South Andaman Isles, Java.

*c*¹. Male, underside both wings rich chrome yellow; no narrow discal line.

938. T. DONATANA, Upper Tenasserim.

b. Male, upperside, forewing entirely black, hindwing with blue costal patch only.

*a*¹. Male, underside bright chrome-yellow.

939. T. MEGISTIA, Khasi Hills.

*b*¹. Both sexes, underside rufous-brown.

*a*². Underside, forewing, discal line sinuous.

940. T VAJNA, Kumaon.

*b*². Underside, forewing, discal line evenly curved and outwardly convex; both wings narrower than in *T. yajna*.

941. T. ISTBOIDEA, Sikkim.

926. Tajuria indra, Moore.

Sithon indra, Moore, Proc. Zool. Soc. Lond., 1883, p. 527; *Polyommatus nedymond*, Godart (*nec* Cramer), Enc. Méth., vol. ix, p. 634, n. 64 (1823).

HABITAT: Bengal, Sikkim, Assam, Orissa, Nilgiris, Canara, Travancore.

EXPANSE: ♂, ♀, 1·37 to 1·80 inches.

DESCRIPTION: "Allied to *S.* [= *T.*] *jalindra*, Horsfield. MALE. UPPERSIDE, *both wings* differ from typical Javan specimens in having comparatively broader brown exterior borders. UNDERSIDE, *both wings* whiter, with narrower upper discal brown band. *Hindwing* with the subanal spot with much less red border. FEMALE. UPPERSIDE, *hindwing* with four small obsolescent widely-separated blue-grey lower submarginal spots above the blackish marginal spots, the anal black spot being surmounted with red, in the Java type of female the hindwing has a broad blue-grey lower marginal band and blue-grey speckled anal spot." UNDERSIDE, *both wings* as in the male. (*Moore*, l. c.)

I admit *T. indra* as a species distinct from *T. jalindra* with some reluctance, as I find that the characters Mr. Moore relies on to separate them are very slight and variable also, especially the extent of the white area on the upperside of the hindwing in the female, which is absent entirely from some specimens, the spots very large in an example I possess from Shillong. *T. indra* has been sent me in considerable numbers by Mr. W. H. Irvine from Bholahât, Malda; it is somewhat rare in Sikkim, occurring from September to November, it is distinctly rare in Calcutta, but affects the flowers of the *Poinsettia*; it occurs in Sylhet and at Shillong, Mr. W. C. Taylor has often taken it in Orissa, and Mr. G. F. Hampson records it as very rare from the lower slopes of the Nilgiris from 2,000 to 5,000 feet elevation. It is a little remarkable that it should be absent in Ceylon, Burma, and the Malay Peninsula, while reappearing again in a slightly changed form in Nias, Sumatra, Borneo, and Java as *T. jalindra*, a description of which is appended.*

927. Tajuria tarpina, Hewitson.

Myrina tarpina, Hewitson, Ill. Diurn. Lep., *Lycænidæ*, Suppl., p. 23, n. 65, pl. Suppl. iii*a*, figs. 93, 94, *female* (1878); *Sithon tarpina*, Wood-Mason and de Nicéville, Journ. A. S. B., vol. xlix, pt. 2, p. 233, n. 47 (1880).

HABITAT: South Andaman Isles.

EXPANSE: ♂, 1·60 to 1·78; ♀, 1·45 to 1·90 inches.

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* *Tajuria jalindra*, Horsfield. *Amblypodia jalindra*, Horsfield, Cat. Lep. E. I. C., p. 109, n. 41 (1829); *Myrina jalindra*, Horsfield and Moore, Cat. Lep. Mus. E. I. C., vol. i, p. 50, n. 85 (1857); id., Hewitson, Ill. Diurn. Lep., pp. 28, 40, n. 3 (1863); Suppl. p. 24, n. 67, pl. iii*a*, Suppl., figs. 96, *male*; 97, 98, *female* (1878); *Sithon thymbræus*, Hübner, Zutr. Ex. Schmett., figs 671, 672, *male* (1832). HABITAT: Java (*Horsfield*), Sumatra (*Hewitson*), Nias Island (*Kheil*), Borneo (*Druce*). EXPANSE: *Male*, 1·8 (Hewitson's figure); *female*, 1·58 (Horsfield), 1·8 (Hewitson's figures). DESCRIPTION: "MALE. UPPERSIDE, *both wings* varying violet-blue, exterior margin of *forewing*, and anterior, exterior, and abdominal margin of *hindwing* brown, anal angle whitish. UNDERSIDE, *both wings* as in female." (*Moore*, l. c.) "MALE. UPPERSIDE, *both wings* brilliant morpho-blue, the margins black. *Forewing* with the costal margin very narrow. *Hindwing* with two tails, the lobe and two caudal spots, which are bordered below with white, black. UNDERSIDE, *both wings* white, the outer margins broadly brown, suffused with grey, and crossed by a band of white. *Hindwing* with three black spots (one V-like) above the anal angle, the lobe (which is crowned with silvery blue) and the caudal spot (which is crowned with orange) black, and a black spot between them, irrorated with silver, the outer margin black, bordered inwardly with white. *Cilia* white." (*Hewitson*, l. c., p. 24). "FEMALE. UPPERSIDE, *both wings* pure brown. *Forewing* immaculate. *Hindwing* with a broad oblong posterior band of a pale azure tint, varying according to the aspect to pale sea-green with a silvery reflexion, bearing at the exterior edge three oblong black marks, of which the interior one has the deepest tint, the whole being bordered externally by a white marginal line, separated from the *cilia* of the same colour by an intermediate black thread which is flexuose in the anal region; the *anal lobe* bears a lunule covered with silvery sea-green resplendent dots. UNDERSIDE, *both wings* with the basal dimidial portion of the surface satin-white, the apical portion brown with a slight violet shade; the latter is further subdivided, in the *forewing*, by an intermediate abbreviated undulated white striga, the posterior half being paler, and the whole of the inner apical [anal] angle gray; in the *hindwing* the marginal portion is white and marked with four obsolete gray spots, fainter as they recede from the outer apical angle; the anal region is white, and bears two very large, strongly pronounced, intensely black circular ocellate spots, with an intermediate round group of greenish silvery irrorations; the exterior ocellus bears internally a broad orange lunule spreading in a radiant manner towards the disc; the second ocellus occupies the anal appendage itself, and is entirely surrounded by a narrow annular iris of a pale green silvery tint; parallel with the ocelli three delicate black marks are arranged in a series, the intermediate one forming an angular mark resembling the letter V, the lateral ones constituting two short oblique striolæ; a very faint oblique bifid streak stretches from the inner ocellus towards the anal angle. *Body* brown above and white underneath. *Antennæ* brown with a ferruginous tip, and marked underneath with delicate bands alternately white and brown. *Tails* white, very delicately fringed at the sides, and marked longitudinally with a distinct black medial line." (*Horsfield*, l. c.)

DESCRIPTION : "MALE. UPPERSIDE, *both wings* rich deep metallic violet-blue, with the external margins broadly and decreasingly bordered with black, the anterior margin of the *forewing* less broadly black bordered. UNDERSIDE, *both wings* with about the basal two-thirds cœrulescent or virescent opaque dead white, the rich red-brown of the outer margins darker but similarly banded and marked with white as in the female, and the orange spots smaller, with a diffused patch of greyish-white scales between them, and the two or three in front of them all somewhat confounded with the white marginal line." (*Wood-Mason* and *de Nicéville*, l. c.) "FEMALE. UPPERSIDE, *both wings* dark brown. *Hindwing* with two tails, the anal lobe, which is crowned with rufous-orange, and the caudal spot, black. *Cilia* white. UNDERSIDE, *both wings* with the basal half white, the outer margin broadly red brown. *Forewing* crossed near the outer margin by a narrow band of white. *Hindwing* with the lobe and caudal spot black, and a pale blue spot between them, all broadly bordered above with rufous-orange, two small submarginal pale blue spots, the margin, which is bordered above with white, black. *Cilia* white." (*Hewitson*, l. c.)

This species is another local race of *T. jalindra*, Horsfield. From *T. indra*, Moore, it differs in the male on the upperside, in the anal lobe of the hindwing having a larger patch of orange in the middle, on the underside the basal two-thirds tinted with bluish or greenish instead of being dead white, the outer red-brown margin deeper in shade, better defined, and carried evenly to the abdominal margin of the hindwing, where in *T. indra* it merges into the white ground-colour. In *T. tarpina* also the red-brown margin in the forewing bears a narrow white line, sometimes outwardly diffused, not continued on to the hindwing; in *T. indra* the white line is always diffused, and is continued on to the hindwing, with an additional outer diffused white fascia not present in *T. tarpina*. The very large size and rich colour of the orange spots at the anal angle of the hindwing is probably the most prominent feature of *T. tarpina*. The two females I have seen as well as the type specimen have no white whatever on the upperside of the hindwing.

T. tarpina appears to be confined to the South Andaman Isles, and is a rare species even there. Probably owing to its insular habitat, its markings appear to be more constant than those of *T. indra*.

928. **Tajuria maculata**, Hewitson. (PLATE XXVIII, FIG. 219 ♂).

Iolaus maculatus, Hewitson, Ill. Diurn. Lep., p. 47, n. 22, pl. xxi, figs. 29, 30, *female* (1865); *Cophanta maculata*, Moore, Journ A. S. B., vol. liii, pt. 2, p. 36 (1884).

HABITAT : Sikkim, Assam.

EXPANSE : ♂, 1·6 to 1·7; ♀, 1·8 to 1·9 inches.

DESCRIPTION : MALE. UPPERSIDE, *both wings* black. *Forewing* with the lower discal area irrorated bluish-white. *Hindwing* dull blue, the costa broadly and outer margin narrowly black, abdominal margin white. UNDERSIDE, *both wings* pure dead white, a fine anteciliary black line. *Forewing* with the following large prominent round black spots :—one at the middle of the discoidal cell, one at its end, one near the middle of the first median interspace, a conjoined pair on the costa divided by the subcostal nervure just before it gives off its third branch, one below these in the upper discoidal interspace nearer the margin, another in the same line in the second median interspace, a figure of 8 spot also in the same line in the submedian interspace, and a submarginal even series of six spots, of which the uppermost, third, and sixth are very much larger than the rest. *Hindwing* with a spot at the extreme base of the wing, a larger one at the base of the costal nervure, an oblique discal series of six spots, a submarginal series of nine spots, of which the two last but one are elongated, joined posteriorly and form a V-shaped figure, and the last is developed into a lengthened streak, and a marginal series of six spots increasing towards the anal angle. "FEMALE. UPPERSIDE, *forewing* dark brown, with a large medial spot of white from the base to beyond the middle, with its base and a spot at its middle lilac. *Hindwing* with the costal margin, a submarginal band of spots, a spot above these, and the outer margin,

dark brown; a submarginal line of white and some lilac spots. UNDERSIDE, *both wings* white, with numerous black spots."

"I have had difficulty in fixing the true position of this very unusually-marked species. It bears a general resemblance to the female of *Hypolycæna phorbas*, [Fabricius, from the Malay Archipelago]. It has, however, the long palpi of *Iolaus*, as well as the third branch from the subcostal nervure of the forewing. Two examples only have, I believe, hitherto arrived in Europe." (*Hewitson*, l. c.)

Rare in Sikkim, though Mr. Otto Möller obtained a beautiful series of it on one occasion. Mr. S. E. Peal has also taken two females at Sibsagar in Upper Assam, and the Rev. Walter A. Hamilton has obtained it in the Khasi Hills. The pattern of the markings of the underside is quite unique amongst Indian *Lycænidæ*. I possess a variety of the male from Sikkim which has all the blue and white coloration of the upperside much developed, the forewing has the costa and outer margin alone rather narrowly black, the hindwing on the costa bears a black streak, with all the black spots of the underside unusually small.

The figure shews both sides of the male variety from Sikkim in my collection mentioned above.

929. **Tajuria illurgis**, Hewitson.

Iolaus illurgis, Hewitson, Ill. Diurn. Lep., Suppl., p. 10, n. 26, pl. iv, figs. 37, 38, *male* (1869); *Cophanta illurgis*, Moore, Journ. A. S. B., vol. liii, pt. 2, p. 36 (1884).

HABITAT: Sikkim, Masuri.

EXPANSE: ♂, 1·65; ♀, 1·90 inches.

DESCRIPTION: "MALE. UPPERSIDE, *both wings* dark brown. *Forewing* with a trifid blue and white spot in the middle. *Hindwing* with two tails; grey-blue, except the costal margin, which is broadly brown, the outer margin and some submarginal spots dark brown. UNDERSIDE, *both wings* white tinted with lilac, a large black spot at the end of the cell, both crossed beyond the middle by a band of linear black spots, both with two submarginal bands of spots. *Hindwing* with a black spot at the apex, the spot between the tails and the lobe black, crowned with orange." (*Hewitson*, l. c.) FEMALE. UPPERSIDE, *forewing* with the medial area of the wing white, the basal portion of this white area, the upper portion of the discoidal cell and the inner margin broadly sprinkled with blue scales, the anal angle narrowly white, the black costal area giving off a black projection or tooth at the disco-cellular nervules. *Hindwing* with the costa broadly black, anteriorly narrowly white, which colour occupies all the middle of the disc, the rest of the wing sprinkled with blue scales; an anteciliary fine black line continued on to the anal angle of the forewing, a small round black spot on the margin in the first median interspace; *tails* black, tipped and ciliated with white. UNDERSIDE, *both wings* as in the male.

I have only seen three specimens of this rare species, a male taken in Sikkim on the 18th July, 1887, by Mr. G C. Dudgeon, and two females taken at Masuri, one in May, 1884, and one on 29th May, 1887, by Mr. P. W. Mackinnon. The female of this species and of the next is a really remarkable mimic in all except size of *Cyaniris albocæruleus*, Moore.

930. **Tajuria illurgioides**, n. sp. (PLATE XXVIII, FIG. 218 ♀).

HABITAT: Naini Tal, Sikkim.

EXPANSE: ♂, 1·5; ♀, 1·6 inches.

DESCRIPTION: MALE and FEMALE. Only differs from *T. illurgis*, Hewitson, on the UNDERSIDE of *both wings* in the black spots defining the disco-cellular nervules being narrow, indistinct, and linear, instead of large, prominent, and somewhat reniform. *Hindwing* with an additional small round black spot near the costal base of the wing, placed below but touching the costal nervure.

The type male was taken by Colonel A. M. Lang at Naini Tal, 6,500 feet, on 15th July, 1887, and is deposited in his collection. I possess a female, taken at Kurseong,

near Darjiling, by Mrs. Wylly, and there is another female in Mr. Otto Möller's collection, taken on Senchal, near Darjiling, at about 8,000 feet elevation, in August, 1883. These two females differ considerably in the extent of the blue and white areas on the upperside of both wings, but agree exactly in the markings of the underside.

The distinctive characters given above for this species may appear trivial, but as they exist in all the specimens of it I have seen, and are absent in *T. illurgis*, while the markings of both species show no variation whatever in my series of specimens of both species, I trust they will prove to be distinctive when larger numbers shall be available for comparison.

The figure shews both sides of the female type specimen from Kurseong in my collection.

931. **Tajuria longinus**, Fabricius.

Hesperia longinus, Fabricius, Ent. Syst., Suppl., vol. v, p. 430, n. 77-78 (1798); *Polyommatus longinus*, Godart, Enc. Méth., vol. ix, p. 634, n. 63 (1823); id., Lucas, Lép. Ex., pl. xliv, fig. 3, *male* (1835); *Amblypodia longinus*, Horsfield, Cat. Lep E. I. C., p. 110, n. 42; *Thecla longinus*, id., l. c., pl. i, fig. 7, *imago*; pl. iv, fig. 5, *larva*; 5*a*, *pupa*; figs. 5*b-e*, *structure of imago* (1829); id., Horsfield and Moore, Cat. Lep. Mus. E. I. C., vol. i, p. 45, n. 70 (1857); *Bithys longinus*, Hübner, Zutr. Ex. Schmett., figs. 933, 934 (1837); *Iolaus longinus*, Butler, Proc. Zool. Soc. Lond., 1867, p. 35; id., Hewitson, Ill. Diurn. Lep., p. 45, n. 18 (1869); id., Butler, Trans. Linn. Soc. Lond., Zoology, second series, vol. i, p. 549, n. 1 (1877); id., Staudinger, Ex. Schmett., p. 275, pl. xcv, *male* (1888); *Iolaus cippus*, race *longinus*, Butler, Cat. Fab. Lep. B. M., p. 186, n. 2 (1869); *Tajuria longinus*, Moore, Lep. Cey., vol. i, p. 109, pl. xlii, figs. 2, *male*; 2*a*, *female*; 2*b*, *larvæ* and *pupa** (1881); id., Distant, Rhop. Malay., p. 244, n. 1, pl. xxiii, fig. 20, *female* (1884); *Amblypodia pseudolonginus*, Doubleday, List Lep. B. M., vol. ii, p. 23 (1847); id., Horsfield and Moore, Cat. Lep. Mus. E. I. C., vol. i, p. 45, n. 71, pl. i, figs. 6, *larva*; 6*a*, *pupa* (1857); *Iolaus pseudo-longinus*, Butler, Proc. Zool. Soc. Lond., 1867, pp. 35, 36, woodcut n. 3, *female*.

HABITAT: Throughout India (except the desert tracts), the outer Himalayas, Ceylon, Burma, Malay Peninsula, Java.

EXPANSE: ♂, 1·2 to 1·8; ♀, 1·5 to 1·8 inches.

DESCRIPTION: "MALE. UPPERSIDE, *both wings* cyaneous blue, with a saturated silvery reflexion changing according to the light to sea-green, the borders throughout and the exterior dimidial portion of the *forewing*, defined by a boundary extending obliquely across the disc, being black, the inner excavated margin of the *hindwing* gray. *Cilia* throughout gray. UNDERSIDE, *both wings* satin-gray with a common striga of minute black arcs, beyond the middle, regular and disposed in close contact in the *forewing*, flexuous and farther removed from the margin in the *hindwing*, interrupted by a more conspicuous arc or angular mark in the curve at the anal region, opposed to the medial space between the tails. *Forewing* has besides between the principal striga and the margin a regular series of very obsolete oblong grayish spots faintly margined with white; this is continued in the *hindwing* by a double series of the same kind with more distinct spots, and followed in the anal region by two intensely black ocellate spots, the exterior one near the marginal notch being small, regularly circular, and bedded in a large fulvous patch with an abruptly transverse interior edge, the other ocellus occupying the anal appendage, being oblong-transverse, bordered internally by a fulvous lunule and ornamented externally by a narrow metallic streak; between these is a round group of delicate silvery irrorations on a hoary ground. The *tails* are black with white edges and tips; the *antennæ* abruptly terminated by a short point, brown with a ferruginous tip, and marked on one side with delicate transverse grayish dots; the *body* is covered with a bluish sea-green down above, and with delicate white hairs underneath. FEMALE. UPPERSIDE, *both wings* sordid white, with pale azure silvery irrorations confined to the base. *Forewing* with broad brown borders. *Hindwing* faintly clouded with brown and paler anterior margin, bearing two rows of minute black spots parallel with the posterior margin, and an extreme black thread; the two interior spots of the exterior series being larger, more

* This figure shews the pupa as freely suspended by the posterior segments as in the family *Nymphalidæ*, which is an unusual position to be assumed by pupæ of this family, as nearly all lycænid pupæ are girt in the middle by a silken thread, in addition to being attached to their support by the anal segments of the abdomen.

pronounced, and succeeded by an obsolete brown lunule on the anal appendage. UNDERSIDE, *both wings* as in the male. The discoidal litura [on the underside of both wings] represented in the figures, does not appear in all our specimens." (*Horsfield*, l. c.)

"FEMALE. UPPERSIDE, *both wings* grey-blue. *Forewing* nearly white towards the middle, the costal and outer margins and apex brown. *Hindwing* with the costal margins rufous-brown, crossed beyond the middle by a zigzag band of dark brown, a submarginal band of brown, two spots at the base of the tails and the apical [anal] spot black."

"I must confess myself quite unable to understand why *I.* [= *T.*] *pseudolonginus*, Doubleday, was separated from this species. It is true that the linear bands on the underside differ much in their intensity and are sometimes nearly absent in the males; but there is no other difference." (*Hewitson*, l. c.)

"LARVA considerably distended anteriorly, excavated at the sides, contracted behind, and transversely swelled at the segments. Feeds on a species of *Loranthus* [in Java], which grows parasitically in great abundance on the mango and other fruit trees surrounding the villages of the natives." (*Horsfield*, l. c.) As figured in the two Catalogues of the Lepidoptera of the East India Company from Dr. Horsfield's drawings, the larva is a singular object; the head is small but prominent, the segments rapidly increasing in breadth from the second to about the fifth, apparently bearing several blunt conical processes on these segments, coloured rich brown from about the sixth to the anal segment, which gradually decrease in width, the dorsal region pale ochreous, the lateral region greyish, the sides of the middle segments excavated, forming a broad triangular figure, of a rich brown colour, anteriorly bounded by a white line. The PUPA is abnormal, being considerably angulated on the abdominal segments, colouring pale brown streaked with darker brown. Mr. Moore (Lep. Cey.) describes the transformations as follows:—"Larva distended anteriorly, excavated on the sides, dorsally contracted behind, and throughout transversely swollen, head small; purple-brown, with grey dorsal and lateral transverse fasciæ. Feeds on *Loranthaceæ*. Pupa purple-brown, short, thick, head truncate, excavated behind the thorax, dorsal segments produced." The figures given are extremely rough as compared with those of Horsfield.

T. longinus is not only the commonest and widest-spread species in the genus, but also one of the most beautiful, the blue coloration of the upperside in the male being exquisite. In Calcutta I have found it abundant on the flowers of the *Poinsettia* during the winter. Mr. Otto Möller possesses specimens taken in the Sikkim Terai in July and September.

932. **Tajuria jehana**, Moore.

T. jehana, Moore, Proc. Zool. Soc. Lond., 1883, p. 529, pl. xlix, fig. 7; id., Swinhoe, l. c., 1885, p. 135, n. 84; idem, id., l. c., 1886, p. 429, n. 65.

HABITAT: Lucknow; Poona, March and December; Bombay, July and November; Mhow, September.

EXPANSE: ♂, ♀, 1·25 to 1·50 inches.

DESCRIPTION: "Allied to *T. longinus*, Fabricius, but of smaller expanse. MALE and FEMALE. UPPERSIDE, *both wings* with the posterior areas slatey-blue. *Hindwing* with three black marginal spots from the anal lobe. UNDERSIDE, *both wings* greyish creamy-white. *Forewing* with a slender indistinct black submarginal line. *Hindwing* with the submarginal line more distinct and zigzag, a prominent anal and subanal black spot, each surmounted inwardly by a yellow lunule, the intermediate space between the spots black-speckled. FEMALE. UPPERSIDE, *hindwing* with a submarginal brownish zigzag band." (*Moore*, l. c.) Otherwise as in the male.

This is doubtless a prefectly good and distinct species, though it may be a little difficult to recognise, as both sexes in coloration resemble very closely the female of *T. longinus*, Fabricius. The male of *T. longinus* is of course abundantly distinct from both sexes of *T. jehana*. Some males in my possession show traces of the submarginal brownish zigzag band on the

upperside of the hindwing, but their sex may be determined by the narrowness and acuteness of the apex of the forewing. In addition to the localities given above, I possess specimens from Masuri (*P. W. Mackinnon*), Bholahât, Malda (*W. H. Irvine*), Barrackpore (*E. A. Minchin*), Orissa (*W. C. Taylor*), Rutnagherry, and the Shevaroy Hills; lastly Mr. Francis A. Fairlie has taken a pair at Jaffna, Ceylon, in July, the first specimens I believe that have been captured in that island.

933. **Tajuria diæus,** Hewitson.

Iolaus diæus, Hewitson, Ill. Diurn. Lep., p. 45. n. 17, pl. xx. figs. 27, 28, *male*; 26, *female* (1865).

HABITAT: Northern India (*Hewitson*); Masuri, Sikkim, Shillong.

EXPANSE: ♂, ♀, 1·4 to 1·5 inches.

DESCRIPTION: "MALE. UPPERSIDE, *both wings* cerulean blue. *Forewing* with the apical half dark brown [black]. *Hindwing* with the apex rufous [fuscous]. UNDERSIDE, *both wings* grey, crossed beyond the middle by a linear rufous band, and an indistinct very pale submarginal band of the same colour. *Hindwing* with the two black spots crowned with orange near the anal angle. FEMALE. UPPERSIDE, *both wings* like those of the male, except that they are of a paler hue. *Forewing* has its middle white, and a small black spot at the end of the cell. *Hindwing* has a submarginal band of brown spots." Otherwise as in the male. (*Hewitson*, l. c.)

This is an extremely rare species, of which I have seen but seven specimens, a male from Masuri, 6,000 feet, taken by Mr. P. W. Mackinnon on 31st March, 1887, two males from Sikkim, one in the collection of the Indian Museum, Calcutta, and one in my own, and a female from the same locality in Mr. Otto Möller's collection, taken on 10th June, 1888, and two in my own collection also from Sikkim, lastly a female taken at Shillong in March by Dr. E. R. Johnson. The anal lobe to the hindwing on the upperside in both sexes is entirely rich red-ochreous, much as in *Manœca bhotea*, Moore; and in the male the shade of blue on the upperside is about intermediate between the dull blue of *T. jehana*, Moore, and the brilliant blue of *T. longinus*, Fabricius. The discal line on the underside of both wings is narrow, continuous, its edges even and well-defined, of a pale brown colour.

934. **Tajuria albiplaga,** de N.

T. albiplaga, de Nicéville, Proc. Zool. Soc. Lond., 1887, p. 459, pl. xxxix, figs. 1, *male*; 2, *female*.

HABITAT: Sikkim.

EXPANSE: ♂, 1·5; ♀, 1·6 inches.

DESCRIPTION: "MALE. UPPERSIDE, *both wings* cerulean blue with hardly any gloss; *cilia* grey throughout. *Forewing* with the costa bounded posteriorly by the subcostal nervure, the apex broadly (including the anterior portion of the cell) and the outer margin decreasingly to the anal angle black. *Hindwing* with the costal margin and apex light fuscous, the two fine *tails* black, tipped with white, a fine anteciliary black line. UNDERSIDE, *both wings* grey, of the same shade as in *T. jehana*, Moore; a prominent, narrow, straight, dark line on the disco-cellular nervules. *Forewing* with a similar discal line not reaching the costa anteriorly, touching the submedian nervure posteriorly; beyond this line is a somewhat similar, but indistinct line. *Hindwing* with a discal line much as in the forewing, but reaching the costa and recurved to the abdominal margin, the upper portion straight as far as the third median nervule, below this the line is formed of outwardly convex lunules; beyond the discal line is an obsolete submarginal line as in the forewing; a small deep black round spot in the first median interspace close to the margin, and another on the small anal lobe, both outwardly margined with pale yellow; no secondary sexual characters. FEMALE larger, both wings broader, the apex of the forewing less acute. UPPERSIDE, *both wings* of a slightly darker shade of blue than in the male; *cilia* white throughout. *Forewing* with a large quadrate diffused white patch on the disc, its inner margin well-defined by the disco-cellular nervules, and that portion of the median nervure between the bases of the first and second median nervules. UNDERSIDE, *both wings* marked exactly as in the male."

"Near to *Tajuria diæus*, Hewitson, from Sikkim, but the blue coloration of the upperside is much lighter; the discal line on the underside of the forewing in *T. diæus* is much straighter, its edges more even, and it increases in width to the costa, which it quite reaches; the colour of all the lines being somewhat rufous also in that species. In the female of *T. diæus*, which sex I have not seen, there is a submarginal band of brown spots on the upperside of the hindwing. *T. albiplaga* is also allied to *T. jehana*, Moore, but the sexes of the former differ considerably, while in the latter they are described as being nearly alike. The three black marginal spots from the anal lobe on the upperside of the hindwing are also absent in *T. albiplaga* in both sexes." (*de Nicéville*, l. c.)

Mr. Otto Möller possesses two males and three females of this species. The female may be known from that of *Camena deva*, Moore, by the white patch on the upperside of the forewing, and also the lines closing the discoidal cells on the underside (a character which will distinguish it from *T. diæus* also) being more prominent, and the discal line of the forewing straighter and more continuous.

935. **Tajuria melastigma**, de N.

T. melastigma, de Nicéville, Proc. Zool. Soc. Lond., 1887, p. 460, pl. xl, fig. 1, *male*.

HABITAT: Sikkim, Khasi Hills, northern slopes of the Nilgiris, Burma.

EXPANSE: ♂, 1·5 to 1·8; ♀, 1·8 inches.

DESCRIPTION: "MALE. UPPERSIDE, *both wings* cerulean blue, of almost the exact shade of the common *Camena cleobis* of Godart. *Forewing* with the costal margin, the apical half of the wing, and the outer margin decreasingly to the anal angle black; a large quadrate shining black 'sexual mark' on the disc, bounded on two sides by the disco-cellular nervules and the first median nervule. *Hindwing* with the outer margin very narrowly black, widening at the apex; the abdominal margin whitish; the anal lobe and inner tail dull reddish, the outer tail black, both tails tipped with white. UNDERSIDE, *both wings* dull pinkish. *Forewing* with the inner margin somewhat broadly greyish; a discal straight narrow deep Indian-red line, outwardly defined with whitish, from near the costa to the submedian nervure; an extremely obscure pale fascia near the margin. *Hindwing* with the discal line in continuation of that on the forewing, the portion between the median nervules very irregular, from the first median nervule oblique to the abdominal margin; the anal lobe marked with a rust-red spot, crowned obscurely with orange; a smaller very obscure spot on the first median interspace, between which the ground is obscurely sprinkled with white scales; two indistinct series of dark spots between the veins above the second median nervule on the margin; an anteciliary fine dark line. *Cilia* fuscous throughout. *Body* blue above, pale red below, whitish at the sides."

"*T. melastigma* has no secondary male sexual characters between the wings, and so far as I am aware, the peculiar shining black quadrate spot on the disc of the forewing on the upperside is unique amongst Indian *Lycænidæ*. Judging from Hewitson's figure alone, it is closely allied to his *Iolaus ister*, the type of which is from 'India,' and is said to be a female; *T. melastigma* may be the hitherto unknown opposite sex of that species." (*de Nicéville*, l. c.)

Mr. Otto Möller possesses three males of this species taken in Sikkim, one of them in March. I have also received a single forewing of a male from Mr. G. F. Hampson, who obtained it in the Nilgiri Hills, South India.

Since the above was written, I have received two females from Mr. Hampson; another is in the collection of the Phayre Museum, Rangoon; and a male from the Khasi Hills is in the collection of Mr. Hamilton. The female may be described as follows:—FEMALE. UPPERSIDE, *both wings* of a slightly duller shade of blue than in the male. *Forewing* with the blue colour more extensive, owing to the absence of the "sexual mark." *Hindwing* has the outer black margin somewhat broader, otherwise as in the male. As I have now obtained both sexes of *T. melastigma*, the male of that species cannot be the hitherto unknown opposite sex of *Camena ister*, which latter I now believe to be a variety only of *C. cleobis*, Godart. Mr.

Hampson has now obtained five specimens in all of this species in the Nilgiris from 2,000 to 3,000 feet elevation, three males and two females. Its known range is peculiar, Sikkim, Khasi Hills, Rangoon, and the Nilgiris, localities very far apart from one another. It will probably be found in intermediate localities.

936. Tajuria mantra, Felder.

Pseudolycæna mantra, Felder, Wien. Ent. Monatsch., vol. iv, p. 396, n. 9 (1860); *Myrina mantra*, Felder, Reise Novara, Lep., vol. ii, p. 238, n. 270, pl. xxx, fig. 14, *male* (1865); *Iolaus mantra* (var. ?), Hewitson, Ill. Diurn. Lep., p. 46, n. 20, pl. xx, fig. 24, *female* (1865); *Tajuria mantra*, Distant, Rhop. Malay., p. 245, n. 2, pl. xxi, fig. 11, *female* (1884); id., Moore, Journ. Linn. Soc. Lond., Zoology, vol. xxi, p. 44 (1886).

HABITAT: Burma, Malacca, Nias Island, Celebes, Macassar?

EXPANSE: ♂, 1·15 to 1·40; ♀, 1·35 to 1·75 inches.

DESCRIPTION: "MALE. UPPERSIDE, *both wings* dilute metallic-cyaneous. *Forewing* with the costal margin and the broad apical half fuscous. *Hindwing* with the anal region somewhat produced, the costal and apical border fuscous, the hinder margin before the cilia black, the internal border hoary. UNDERSIDE, *both wings* hoary-fuscous, with an external streak angulate towards the anal angle [of the hindwing] fuscous, circled with much paler, and another submarginal obsolete. *Hindwing* with a subanal spot and another anal both black, inwardly broadly surrounded with golden-yellow, outwardly bordered with metallic-greenish, sprinkled with metallic-greenish dots, a whitish line before the hinder margin. FEMALE. UPPERSIDE, *both wings* pale violascent-cerulean blue. *Forewing* with the apical border a little narrower than in the male. *Hindwing* with the fuscous border paler, connected with the anal marginal smoky-fuscous spots powdery diffused, with a whitish antemarginal line evanescent towards the apex. UNDERSIDE, *both wings* paler than in the male. *Hindwing*, with spots somewhat fuscous within the whitish marginal line."

"Likewise related to the group of *M.* [= *Tajuria*] *longinus*, Fabricius." (*Felder*, l. c. in Reise Novara).

This is apparently a very rare species, the only specimens I have seen being a pair taken by Dr. J. Anderson in the Mergui Archipelago in the cold weather. The species is easily distinguished by the large patch of clear yellow at the anal angle of the hindwing on the underside. The tint of blue on the upperside of the male is a little more violet than in *T. longinus*, Fabricius, and it is not quite so brilliant in shade.

T. relata, Distant, is close to, but I think quite distinct from, *T. mantra*, Felder. In the latter species the discal line is very slightly outwardly curved on the underside of the forewing, in *T. relata* it is much outwardly bowed. I give its description below.*

937. Tajuria jangala, Horsfield.

Amblypodia jangala, Horsfield, Cat. Lep. E. I. C., p. 113, n. 44, *female* (1829); id., Horsfield and Moore, Cat. Lep. Mus. E. I. C., vol. i, p. 46, n. 75, pl. i*a*, fig. 11, *male* (1857); *Myrina jangala*, Hewitson, Ill. Diurn. Lep., p. 37, n. 37 (1865); *Remelana jangala*, Moore, Journ. A. S. B., vol. liii, pt. 2, p. 37 (1884); *Myrina ravata*, Moore, Proc. Zool. Soc. Lond., 1865, p. 776, pl. xli, fig. 11, *female*; id., Hewitson, Ill. Diurn. Lep., Suppl., p. 5, n. 54 (1869); *Sithon westermannii*, var., Wood-Mason and de Nicéville, Journ. A. S. B., vol. xlix, pt. 2, p. 233, n. 46 (1880); '*S.*' *westermannii*, var., *andamanica*, id., l. c., vol. l, pt. 2, p. 249, n. 66 (1881).

HABITAT: Sikkim, Assam, Burma, South Andaman Isles, Java.

EXPANSE: ♂, ♀, 1·4 to 1·7 inches.

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* *Tajuria relata*, Distant, Rhop. Malay., p. 246, n. 3, pl. xxi, fig. 12, *female* (1884): p. 460 (1886). HABITAT: Province Wellesley, Malacca. EXPANSE: *Female*, 1·4 inches. DESCRIPTION: "FEMALE. Allied to *T. mantra*, Felder, but differing in the following respects:—UNDERSIDE, *both wings* dark greyish, and not brownish-ochraceous as in Felder's species, and the narrow fuscous submarginal fascia is rounded and outwardly convex on the *forewing*."

"Although I only possess a single female specimen of this species, it is still, though closely allied to *T. mantra*, so very distinct in many important characters, as to necessitate its description as a new species." (*Distant*, l. c., p. 246).

"MALE. UPPERSIDE, *both wings* cerulean-blue. *Forewing* with the costal margin greyish-brown, the apex broadly dark fuscous, this colour extending to near the outer angle. *Hindwing* with the costal margin greyish-brown, the outer margin very narrowly fuscous. UNDERSIDE, *both wings* as above" [? as in the female]. (*Distant*, l. c., p. 460).

DESCRIPTION: "MALE. UPPERSIDE, *both wings* brownish-black, with the discoidal cell and posterior base of the *forewing* and the middle of the *hindwing* shining indigo-blue." (*Moore*, l. c. in Cat. Lep. Mus. E. I. C.)

"FEMALE. UPPERSIDE, *both wings* uniformly dark brown, with a very faint varying purple reflexion. *Hindwing* with the inner margin silky-gray; anal appendage bearing a saturated ferruginous lunule and confined exteriorly by a white arc, behind which is a delicate black line gradually evanescent towards the marginal notch. *Cilia* gray throughout. UNDERSIDE, *both wings* ferruginous-brown with a glaucous gloss changing to purple according to the direction of the light; disc marked with a short double brownish litura; between this and the posterior margin follows a delicate but distinct brown striga with a purple gloss, consisting of minute linear fragments which in the forewing are regular and contiguous, forming a slightly curved striga commencing at a small distance from the costa and terminating at the anal area. *Forewing* with the anal area ferruginous-gray. *Hindwing* with the discal striga passing over the whole surface, being broken at the costa, slightly waving in the middle region, and then passing, after several interruptions, to the inner margin, being marked in the anal region exteriorly with several whitish angular clouds; the whole of the anal portion of the wing is covered with a saturated ferruginous band continued obliquely to the anterior apical angle, regularly defined interiorly, and bearing exteriorly at the margin two very large circular spots, ferruginous-brown, varying to purple, and separated by a group of white atoms: the inner edge is ornamented with four delicate emerald-green marks with a golden lustre, the first near the middle of the margin being short and linear, the second forming a semicircular arc above the exterior ocellus, the third opposed to the intermediate group of atoms being angular or resembling the letter V, the fourth forming a minute lunule over the interior ocellus, from which it is continued one-third of the length of the inner margin; exteriorly the anal region is bordered by a delicate grayish thread, beyond which a brownish *cilia* extends along the wings. *Body* brown above, pale ferruginous-gray underneath. *Antennæ* brown with numerous white bands on one side. *Tail* black tipt with white." (*Horsfield*, l. c.)

Variety from Northern India. "FEMALE. UNDERSIDE, *both wings* rufous. *Hindwing* with the spots near the anal angle also rufous but darker." (*Hewitson*, l. c. p. 37)

A common species at low elevations in Sikkim, and occurs in July, October, and November. The sexes hardly differ, but the female has the wings rather broader, the ground-colour on both sides rather paler, and the purple coloration of the upperside more inclined to blue than in the male. In exceedingly fresh specimens of the male, on the upperside of the forewing, may be observed a 'sexual-mark' exactly similar to that described above in *T. melastigma*, mihi, but not nearly as prominent. *T. jangala* is subject to considerable variation on the underside as shown by Sikkim specimens. The ground-colour is usually very dark ferruginous, and the anal spot and the spot in the first median interspace in the hindwing are jet-black. In some specimens the ground-colour is dark ochreous, the spots mixed with reddish. Another form, of which I possess a typical specimen, has the ground-colour clear chrome-yellow, the spots jet-black. This has been described as a distinct species as below* under the name

* *Tajuria ravata*, Moore. *Myrina ravata*, Moore, Proc. Zool. Soc. Lond., 1865, p. 776, pl. xli, fig. 11, *female*; id., Hewitson, Ill. Diurn. Lep., Suppl., p. 5, n 54 (1869). HABITAT: Bengal. EXPANSE: *Female*, 1·5 inches. DESCRIPTION: "FEMALE. UPPERSIDE, *both wings* purple-brown, discoidal cell and space below purple-blue. *Hindwing* with two tails, bordered and tipped with white. UNDERSIDE, *both wings* chrome-yellow. *Forewing* with a transverse discal pale brown narrow line *Hindwing* with discal pale brown line terminated with continuous white spots, a large black spot above each tail, interspaced with brown, bordered above by a broken line of metallic green, and below by a white line. *Cilia* from anal angle to beyond the tails black, edged with white." (*Moore*, l. c.)

"Near to *Myrina* [= *Tajuria*] *megistia*, Hewitson [from the Khasi Hills], but scarcely likely to be its female, since it is decorated above the anal black spots [on the underside of the hindwing] with 'metallic green." (*Hewitson*, l. c.)

This species seems not to have been recognised by any one since its description nearly twenty-five years ago. It is strange that Mr. Moore failed to see its close relationship to *T. jangala*, Horsfield, its sole point of difference being the colour of the ground on the underside. Neither did he place it in his genus *Remelana* when describing the latter. It is a rare form of *T. jangala*, and I have only seen one specimen which absolutely

of "*Myrina*" *ravata* by Mr. Moore. Lastly a rare form occurs in which the ground-colour is yellow-ochreous, the spots ferruginous. These different varietal forms pass into one another, they cannot be specifically discriminated. *T. jangala* appears to occur not infrequently at Rangoon, and is common in Assam.

Local race *andamanica*. EXPANSE: ♂, 1·3 to 1·4; ♀, 1·4 to 1·5 inches. HABITAT: South Andaman Isles. DESCRIPTION: MALE. UPPERSIDE, *both wings* purplish-fuscous, the purple patches of *T. jangala*, Horsfield, replaced by much smaller patches of a bluer shade. *Forewing* with an inconspicuous patch slightly paler than the ground on the middle of the disc. "FEMALE, differs from the male in having the UPPERSIDE of *both wings* smoke-brown instead of purplish-fuscous, no discal pale patch on the *forewing*, the *hindwing* devoid of blue, and the UNDERSIDE of *both wings* ochraceous-brown instead of dark fawn-colour with a vinous tinge. The male differs from the same sex of *S.* [= *T.*] *westermannii*, [Felder, from Luzon]. in having less blue on the upperside, and the anal spot completely encircled with grey scales."

"A comparison of Andamanese and Philippine specimens would, we have no doubt, show that the former is just as much entitled to a name of its own as the latter. Both are merely insular races of the Indian continental *S. jangala*." (*Wood-Mason* and *de Nicéville*, l. c. Journ. A. S. B., vol. xlix).

"*Dipsas westermanii* of Felder is a variety of *Myrina jangala*, Horsfield, of this work." (*Hewitson*, Ill. Diurn. Lep., Suppl., p. 8).

The late Mr. A. R. de Roepstorff obtained four males and three females of this species in the Andamans. The ground-colour of the underside is variable as in *T. jangala*, one female is nearly as bright yellow as in Mr. Moore's species *ravata*.

A species closely allied to *T. jangala* has been described as below* from the Malay Peninsula, Sumatra, and Borneo.

938. Tajuria donatana, de N. (PLATE XXV, fig. 154 ♂).

T. donatana, de Nicéville, Journ. A. S. B., vol. lvii, pt. 2, p. 287, n. 18, pl. xiv, fig. 15, *male* (1888).

HABITAT: Upper Tenasserim.

EXPANSE: ♂, 1·35 inches.

DESCRIPTION: "MALE. UPPERSIDE, *both wings* deep purplish-black. *Forewing* with the basal and lower discal areas rich deep iridescent blue, the colour extending slightly into the discoidal cell from the base of the first median nervule to the base of the wing. *Hindwing* with an elongated discal patch of rich iridescent blue of a lighter and brighter shade than in the forewing; the abdominal margin anteriorly pale fuscous and fringed with white; anal lobe white, marked by a round black spot, bearing a few metallic silvery scales; *cilia* from the anal angle to the second median nervule white, thence to the apex of the forewing

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agrees with the description and figure, but I possess other Sikkim specimens which approach it very nearly.

* *Tajuria travana*, Hewitson. *Myrina travana*, Hewitson, Ill. Diurn. Lep., p. 38, n. 38, pl. xvii, figs. 59, 60, *male* (1865); id., Butler, Trans. Linn. Soc. Lond., Zoology, second series, vol. i, p. 549, n. 2 (1877); *Sithon travana*, Druce, Proc. Zool. Soc. Lond., 1873, p. 352, n. 9; *Remelana travana*, Moore, Journ. A. S. B., vol. liii, pt. 2, p. 37 (1884); *Tajuria travana*, Distant, Rhop. Malay., p. 246, n. 4, pl. xxii, fig. 4, *female* (1884). HABITAT: Malacca, Perak, Singapore, Sumatra, Borneo. EXPANSE: *Male*, 1·5 to 1·7 inches. DESCRIPTION: "MALE. UPPERSIDE, *both wings* dark brown, with a spot of violet-blue near the base. UNDERSIDE, *both wings* dark rufous-brown, crossed beyond the middle by a linear band of dark brown. *Hindwing* with a spot at the base of the tail, a spot outside of this, a spot at the anal angle, and a fourth spot between the last two irrorated with white, all crowned with brilliant silver-blue; below these spots a submarginal line of white."

"This species is easily distinguished from *M.* [= *T.*] *jangala*, Horsfield, by its much greater breadth of wing." (*Hewitson*, l. c.)

In the Indian Museum, Calcutta, is a specimen of this species from Perak, which, from an examination of the prehensores, I find to be a male. It differs from Sikkim specimens of *T. jangala* in the costa of the forewing being shorter, the wing thus having a more truncated appearance. The anal lobe to the hindwing on the upperside is black marked anteriorly with a clump of metallic green scales. The discal line on the underside is very narrow and clearly defined, and the white spots placed outwardly against it in *T. jangala* towards the anal angle of the hindwing are obsolete in *T. travana*. I am of opinion that *T. travana* should be treated as a local race only of *T. jangala*.

black. UNDERSIDE, *forewing* rich chrome-yellow, unmarked, the inner margin broadly pale fuscous. *Hindwing* rich chrome-yellow; the anal area sprinkled with black and white scales; the anal lobe intensely black, with an intensely black small round spot on the margin in the first median interspace; the black and white anal area bounded anteriorly by an irregular iridescent greenish silvery line, above which is an irregular W-shaped white figure finely defined with black; a fine black anteciliary line from the anal angle to the discoidal nervule. *Tails* black, tipped with white, the outer rather the shorter."

"A smaller species than the '*Myrina*' *orsolina* of Hewitson,* from Celebes and Macassar; differing in the shape of the blue patch on the upperside of the forewing, which in that species is deeply indented at the base of the first median nervule; also by the absence on the underside of both wings of the very pale broken linear brown band described, but not shown in the figure, as occurring in *M. orsolina,* and in other details."

"I have described *T. donatana* from a single example taken by Major C. T. Bingham in the Donat Range, Upper Tenasserim, in April." (*de Nicéville,* l. c.)

The figure shews both sides of the type male specimen from Burma in my collection.

939. **Tajuria megistia,** Hewitson.

Myrina megistia, Hewitson, Ill. Diurn. Lep., Suppl. p. 5, n. 53, pl. Suppl. iii, figs. 77, 78, *male* (1869).

HABITAT: Unknown (*Hewitson*); Khasi Hills.

EXPANSE: ♂, 1·35 inches.

DESCRIPTION: "MALE. UPPERSIDE, *both wings* dark brown. *Hindwing* with two tails, the costal margin [broadly] cerulean blue, a black spot at the anal angle irrorated with white, the *cilia* and a submarginal line at the base of the tails white. UNDERSIDE, *both wings* orange, crossed by a pale rufous band bordered outwardly with white. *Hindwing* with the anal angle grey irrorated with black, bordered above with white lunular spots and lines of white at right angles with them; two large black spots at the base of the tail." (*Hewitson,* l. c.) FEMALE unknown.

Through the kindness of the Rev. Walter A. Hamilton, I have seen four males of this species taken in the Khasi Hills, three of which he has given me. They may at once be known from that sex of *T. yajna,* Doherty, and *T. istroidea,* mihi, in the smaller extent of the blue patch of the hindwing on the upperside, which only just reaches to within the upper outer angle of the cell, and nowhere touches the discoidal nervule. On the underside the bright chrome-yellow colour of both wings, and the large size of the two anal deep black spots of the hindwing, distinguish *T. megistia* at a glance from its allies.

940. **Tajuria yajna,** Doherty.

Remelana yajna, Doherty, Journ. A. S. B., vol. lv, pt. 2, p. 128, n. 140 (1886); idem, id., l. c., vol. lviii, pt. 2, p. 134, pl. x, fig. 7, *male* (1889).

HABITAT: Garjiaghat and Baghrihat, on the Kali, 2,500—3,000 feet, Kumaon.

EXPANSE: ♂, 1·33 inches.

DESCRIPTION: MALE. "Allied to the *Myrina megistia* of Hewitson. UPPERSIDE, *both wings* black. *Hindwing* with the upper part glittering azure from the first subcostal to the discoidal nervule, extending beyond into the cell (slightly), and almost to the costal nervure and the third median nervule, but not approaching the apex or the costa; anal lobe gray, touched with fulvous and bluish; a slender marginal bluish line on the lower part of the wing. *Cilia* black. UNDERSIDE, *both wings* rufous-brown, darker at the apex of the forewing; a broken submarginal darker line obscurely visible. *Hindwing* crossed by a slender transverse line of fulvous, almost straight to the first median nervule, bordered outwardly with slender lines of black and white, continued by similar lines at right angles with it from the first median nervule to the abdominal margin. On the *forewing* the line is chiefly white (the

* Ill. Diurn. Lep., p. 38, n. 39, pl. xvii, figs. 56, 58, *male*; 57, *female* (1865).

fulvous and black being obsolescent), slender and sinuous, extending from the submedian nervure almost to the costa. *Hindwing*, lower part with a large area of gray extending to the third median nervule, bordered outwardly with white and black lines ; part of abdominal margin white ; anal black spot partly bordered with fulvous and silvery-lilac ; a submarginal black-centred fulvous spot between the first and second median nervules. *Tails* black, tipped with white, the outer more slender than the inner, and somewhat shorter. *Antennæ* black, annulated with white, club black." FEMALE unknown.

"Differs from *R. megistia*, Hewitson, habitat unknown, in the ground-colour of the underside, which is dull rufous-brown, that of Hewitson's species being orange (in his description) or orange-yellow (in his plate)." (*Doherty*, l. c.)

941. **Tajuria istroidea**, de N. (PLATE XXV, FIG. 153 ♂).

T. istroidea, de Nicéville, Proc. Zool. Soc. Lond., 1887, p. 458, pl. xl, fig. 3, *female*; idem, id., Journ. A. S. B., vol. lvii, pt. 2, p. 286, n. 17, pl. xiv, fig. 14, *male* (1888).

HABITAT : Sikkim.

EXPANSE : ♂, 1·40 ; ♀, 1·45 inches.

DESCRIPTION : "MALE. Differs from the description of '*Remelana*' *yajna*, Doherty, on the UPPERSIDE of the *hindwing* in the glittering azure patch being of greater extent, occupying the anterior half of the discoidal cell, instead of extending into it slightly, and reaching to the costa and to the apex of the wing. On the UNDERSIDE the apex of the *forewing* is concolorous with the rest of the wing, not darker as in *R. yajna* ; the discal line is outwardly evenly curved, of a deeper rufous than the ground-colour, outwardly defined by a fine white line, instead of being chiefly white, slender, and sinuous, and there is no trace of an outer black bounding line in *T. istroidea* ; the *hindwing* has the abdominal margin concolorous with the rest of the wing, not partly white as in *R. yajna*."

"Described from a single specimen taken in Sikkim on 2nd December, 1887, in Mr. Otto Möller's collection. The underside agrees exactly in colour and markings with the female, except that the ground-colour is rather darker." (*de Nicéville*, l. c. in Journ. A. S. B.)

Through the kindness of Mr. W. Doherty, and since the above was written, I have examined the type male of *Tajuria yajna*. It differs from the male of *T. istroidea* chiefly in having both wings perceptibly broader ; the discal band on the underside of the forewing distinctly sinuous, not evenly outwardly convex ; the band on both wings in *T. yajna* is more broken up into short internervular portions, and the band on the hindwing has its posterior portion formed of zigzags scarcely half as long as in *T. istroidea*.

"FEMALE. UPPERSIDE, *both wings* deep black. *Cilia* greyish-fuscous. *Forewing* with the disc and base rich blue, with hardly any gloss. *Hindwing* with the disc and base also rich blue, outwardly nearly to the margin sprinkled with blue scales between the veins; an anteciliary fine blue line from the anal angle to the third median nervule ; anal lobe rufous, with a black centre sprinkled with white scales ; *tails* black, tipped with white. UNDERSIDE, *both wings* rufescent or cinnamon-coloured. *Cilia* of the colour of the ground. *Forewing* with a prominent, slightly outwardly-curved discal line, of a deeper shade of red than the ground, outwardly defined by brilliant white, this line does not quite touch the costa, and ends posteriorly at the submedian nervure ; a submarginal indistinct somewhat macular fascia. *Hindwing* with the discal band as in the forewing, its upper portion as far as the third median nervule straight, below highly zigzag, and curved upwards to the abdominal margin ; the submarginal fascia as in the forewing, ending in a small round deep black spot, broadly surrounded with ferruginous, in the first median interspace ; the anal lobe entirely occupied by a large round deep black spot, crowned with a very few greenish-silvery scales ; the area between the two spots and beyond the anterior one, as far as the third median nervule, thickly irrorated with black and white scales ; a fine black anteciliarly line from the anal angle to the third median nervule, defined on both sides by an equally fine pure white line."

"Most nearly allied to the '*Iolaus*' *ister* of Hewitson*, from 'India,' but differing therefrom in its broader wings, the apex of the forewing less acute, the outer margin convex, the blue coloration of the upperside deeper and richer in shade and confined to the basal and discal areas of the wings (all these are female characters); the markings of the underside much the same, but the discal line on the forewing considerably further from the margin, rather less so on the hindwing. I have described this species with some hesitation, solely owing to the fact that Hewitson, in describing *I. ister*, seems to have gone out of his way to emphasize the fact that his species was described from a female; judging from his figure alone, I should have said that it was taken from a male, and that my specimen (which is unquestionably a female) was the opposite sex. The matter must remain in abeyance till some one will examine the sex of Hewitson's type."†

"Described from a single example in the collection of Mr. Otto Möller." (*de Nicéville*, l. c. in Proc. Zool. Soc. Lond.)

The figure shews both sides of the male type specimen from Sikkim, in the collection of Mr. Otto Möller.

I give as a foot-note below‡ a description of the genus *Purlisa* of Distant. It is monotypic, and occurs at Penang in the Malay Peninsula. Mr. Distant places the genus between *Neomyrina*, Distant, and *Cheritra*, Moore, both of which come into my *Myrina* group, which is characterised by having the one or the other of its tails over half an inch in length. Judging from the figures of *Purlisa gigantea*, Distant, it appears to resemble most closely some of the

* I have shewn before (*ante*, p. 344), and since the above was written, that the "*Iolaus*" *ister* of Hewitson is probably nothing but a varietal form of the female of *Camena cleobis*, Godart.

† I have no doubt now that the type of *Iolaus ister* is a female, as Mr. Hewitson states: the female of *C. cleobis*, in the absence of its male, would probably be taken for a male by most entomologists.

‡ Genus *Purlisa*, Distant. *Purlisa*, Distant, Rhop. Malay., p. 249 (1885). "FOREWING, subtriangular; *apex* subacute; *costal margin* arched and convex; *outer* margin nearly straight, very slightly concave; *inner* margin nearly straight, very slightly concavely sinuate; *costal nervure* short, terminating on the costa before the end of the cell [this is unusual]; *first subcostal nervule* emitted near the middle of the cell and terminating on the costa a little beyond the end of the cell [unusually short]; *second* subcostal emitted about midway between the bases of the first and third; *third* subcostal emitted a little before the end of the cell; third and *fourth* subcostals bifurcating at about two-thirds the length of the third; *third median* nervule curved and emitted from the end of the cell; *second* and *first* median nervules straight, and nearly twice the distance apart as second is from third. HINDWING, elongately and irregularly subtriangular, *costa* convex, *posterior margin* oblique, *abdominal* margin acutely cleft near the anal angle, *posterior* margin with a long *tail* at the apex of the submedian nervure, and a short one at the apex of the first median nervule; *costal nervure* not quite reaching the apex of the wing, *subcostal nervules* bifurcating a little before the end of the cell, *third* and *second median* nervules with an apparently common origin near the end of the cell. *Palpi* long and porrect, second joint robust, clothed with short adpressed hairs, and extending more than half its length in front of the eyes, apical joint moderately slender and about half the length of the second. *Antennæ* with a very slender and gradually-formed apical club."

"Although the name of this genus has appeared before ('Aid to the Identification of Insects,' vol. i, plate xlvi), it has not been previously described, and was used by Mr. Waterhouse in error. I originally described the typical species under the name of *Iolaus* (*Purlisa*) *giganteus*, the name *Purlisa* being a proposal of Mr. Moore, but in 'Aid' the name '*Iolaus*' was discarded, and the hitherto unpublished name of '*Purlisa*' alone substituted." (*Distant*, l. c.)

Purlisa gigantea, Distant. *Iolaus* (*Purlisa*) *giganteus*, Distant, Ent. Month. Mag., vol. xvii, p. 245 (1881); *Purlisa gigantea*, Waterhouse, Aid, vol. i, pl. xlvi (1882); id., Distant, Rhop. Malay., p. 250, n. 1, pl. xxi, fig. 28 (1885). HABITAT: Penang. EXPANSE: 2·05 inches. DESCRIPTION: "UPPERSIDE, *both wings* brilliant cerulean-blue. *Forewing*, costal margin to about one-third from the base broadly hoary-grey; remainder of costal margin, apical third and outer margin dark fuscous. This dark fuscous portion occupies rather more than one-third of the wing, commencing at the costa it is curved downwards past the end of the cell, gradually narrowing and terminating near the posterior angle on the inner margin. *Hindwing* bi-caudate, with the outer margin broadly dark fuscous, terminating at the anal angle with a lunulate fuscous spot, irrorated with blue scales, outwardly margined with white, followed by the dark line separating the *cilia*, which are white. *Tails* fuscous, bordered with a white fringe. *Abdomen* and inner margin of wings hoary and pilose. UNDERSIDE, *both wings* smoky-grey, crossed by a submarginal narrow dark fascia, commencing about midway between the end of the cell and the margin, which is sharply defined outwardly, and evanescent inwardly, waved, but entire on the forewing, but deeply sinuate towards the apex of the hindwing; a pale marginal border containing some obscure lunulate marks on the *forewing*, and a double row of smoky sublunulate marks on the *hindwing*; a black spot faintly margined with blue before the base of the first tail, and a larger spot of the same colour at the anal angle; *cilia* of the forewing concolorous, of the hindwing white." (*Distant*, l. c. in Ent. Month. Mag.)

"This appears to be an exceedingly rare species. I possess but one specimen, and the only other example which I have seen is a much mutilated and unlocalised one in the collection of Mr. F. Moore, where it has been for the last twenty years. During this time it has frequently excited the interest of the owner and the late Mr. Hewitson, but its condition prevented its proper determination." (*Distant*, l. c. in Rhop. Malay.)

I have not seen this species. The sex of the specimens described is not stated, and it would be hazardous even to guess from the figures and descriptions what sex they may be.

species of *Tajuria*, Moore, and as neither tail reaches half an inch in length, I place the genus next following *Tajuria*. The sex of the type species is apparently unknown, and no secondary sexual characters have been described as appertaining to it. The butterfly is a very large one, as its name implies, Mr. Distant's figure of it measuring 2·1 inches in expanse of wings. It is blue on the upperside, with the usual broad costal and outer black margins; underside brown, the hindwing marked with the two usual anal black spots.

Genus 148.—SUASA, nov. (Plate XXVIII).

Of small size. Forewing, short, broad; *costa* slightly arched at base, thence nearly straight to apex, *apex* rounded, *outer margin* convex, *inner* margin straight; *costal nervure* ending a little before the apex of the discoidal cell, sinuous; *first subcostal nervule* close to its base slightly bowed upwards towards the costal nervure, but quite free from that nervure; *second* subcostal straight, its base about midway between the bases of the first subcostal and upper discoidal nervules; *third subcostal* very short, arising much nearer to the apex of the wing than to that of the cell; *middle disco-cellular* nervule given off from the upper discoidal soon after the origin of the latter, straight, slightly outwardly oblique; *lower* disco-cellular rather longer than the middle disco-cellular, straight, upright; *second median* nervule given off a short distance before the lower end of the cell; *submedian nervure* straight. Hindwing, broad, somewhat lengthened, furnished with two *tails*, a long one at the termination of the submedian nervure, and a short one about half the length of the other, at the termination of the first median nervule; a very small anal lobe; *costal nervure* arched at base, thence straight to apex; *first subcostal nervule* given off some distance before the apex of the cell; *upper disco-cellular* nervule slightly concave, outwardly oblique, *lower* disco-cellular almost upright, nearly straight; *second median* nervule given off immediately before the lower end of the cell; *submedian nervure* straight; *internal nervure* remarkably long, rather sinuous. Male without secondary sexual characters. Type, *Myrina lisides*, Hewitson.

As far as I am aware, *Suasa* is confined to the type species, *S. lisides*, Hewitson. Quite recently Mr. Moore placed it in the genus *Chliaria*, but it differs from all the species of that genus in having a third subcostal nervule to the forewing, and the internal nervure of the hindwing much longer; the inner tail also being twice as long as the outer one is a feature not found in *Chliaria*. The structure of *Suasa* is unusual from the shortness of the third subcostal nervule to the forewing, and the great length of the internal nervure to the hindwing.

942. Suasa lisides, Hewitson. (Plate XXVIII, Fig. 220 ♂).

Myrina lisides, Hewitson, Ill. Diurn. Lep., p. 33, n. 21, pl. xiv, figs. 28, 29, *male* (1863); *Chliaria lisides*, Moore, Journ. Linn. Soc. Lond., Zoology, vol. xxi, p. 43 (1886).

Habitat: Sylhet (*Hewitson*), Mergui Archipelago, Malay Peninsula.

Expanse: ♂, 1·15 to 1·25; ♀, 1·15 to 1·30 inches.

Description: "Male. Upperside, *both wings* brown. *Forewing* with the middle rufous, the base irrorated with blue. *Hindwing* cerulean blue, with two tails, the costal margin and apex broadly brown; the caudal spot, the outer margin, and base of the tails black. *Cilia* and *tails* white. Underside, *both wings* white. *Forewing* with a large quadrate spot on the costal margin beyond the middle, a line below it, the outer margin, and a submarginal line rufous. *Hindwing* with a rufous spot before the middle, a spot near the apex, and two submarginal bands of linear spots; the caudal spot, the lobe, and a spot between them (which are dotted with pale blue), the base of the tails, and the outer margin, all black." (*Hewitson*, l. c.) "Female. Upperside, *forewing* with a similar but broader reddish patch than in the male, which is confined more to the middle, [no blue irroration at the base]. *Hindwing* brown, anal area broadly white-speckled, and with three prominent black anal marginal spots. Underside, *both wings* similarly marked to the male, excepting that there is no subbasal black spot" [on the *hindwing*]. (*Moore*, l. c.)

Of this rare species I have only seen three specimens taken by Dr. J. Anderson in the Mergui Archipelago in December, January and March, a male from the Khasi Hills taken by the Rev. Walter A. Hamilton, and a female from Selangor in the Malay Peninsula. The latter differs from the two females from Burma in having the upperside of the forewing entirely smoky-brown, the orange patch being wholly wanting; on the hindwing the white irroration at the anal angle is much reduced. Mr. Doherty obtained a single specimen at Myitta in the Tenasserim Valley, Burma. As far as I know it has no near allies, and is very easily recognised. It appears to be a very rare species.

The figure shews both sides of a male specimen from the Khasi Hills in my collection.

Genus 149.—THAMALA, Moore. (PLATE XXVIII).

Thamala, Moore, Proc. Zool. Soc. Lond., 1878, p. 834.

"MALE and FEMALE. FOREWING, short, broad, trigonate; *costa* convex at base, *apex* moderately acute, *exterior margin* slightly oblique and recurved, *posterior* margin nearly straight, *anal angle* acute; *discoidal cell* broad, short; *subcostal nervure* four-branched, first, second and third arising before the end of the cell, fourth at its end; *disco-cellular nervules* slightly curved outwards; [*lower*] *radial* from their middle; *median nervure* three-branched, two upper branches contiguous at base from the end of the cell. HINDWING, elongated posteriorly, narrow and quadrate below the anal margin; with two narrow lengthened tails, one at each angle; *exterior margin* slightly waved. BODY moderate. *Antennæ* stout, uniformly thickened to apex. *Palpi* long, squamous, second joint projecting half its length beyond the head, apical joint slender. *Legs* squamous, femora slightly pilose beneath."

"Differs from *Deudorix* (*D. melampus* (*jarbas*, Fabricius), and *D. epijarbas*, Moore) in its shorter and broader forewing and longer hindwing, the forewing having only four subcostal branches (there being five in both the above species), and in the antennæ being more robust." (*Moore*, l. c.) *Deudorix jarbas* has been placed by Mr. Moore since the above description was written in his genus *Nadisepa*, and is distinct from *melampus*, Cramer, which Mr. Moore now places in his genus *Baspa*. I include both species under the genus *Rapala*, Moore.

I am indebted to Mr. W. Doherty for the gift of a male specimen of *T. marciana*, Hewitson, from S.-E. Borneo, which has enabled me to bleach one pair of wings and to carefully examine the neuration. In the forewing the costal nervure ends opposite to the apex of the cell; the base of the second subcostal nervule is half as near to the base of the first subcostal as to the base of the upper discoidal; the discoidal cell is long, extending to more than half the length of the wing, its outer end rounded; the middle disco-cellular nervule springs from the upper discoidal some little distance from its base, is convex and slightly outwardly oblique; the lower disco-cellular is a little longer than the upper, upright, straight, and forming nearly one straight line with the upper; second median nervule given off some little distance before the lower end of the cell; submedian nervure recurved, with, in the male, a narrow glandular patch of scales differently formed to those on the rest of the wing lying on either side of the nervure for a short distance from its origin, below which the inner margin of the wing is slightly outwardly bowed. In the hindwing the costa is well arched and formed to cover the glandular patch on the forewing, and following its outline; the costal nervure is much curved at the base, slightly so thence to the apex of the wing; the first subcostal nervule considerably arched, arising at a moderate distance before the apex of the cell; disco-cellular nervules straight, of equal length, outwardly oblique, the upper slightly sinuous and rather more oblique than the lower; second median nervule given off rather near to the lower end of the cell; submedian nervure straight, not extending to the apex of the inner tail; internal nervure very long, slightly curved. The antennæ are long, more than half as long as the costa of the forewing; the palpi of the female much longer than those of the male; the eyes are naked.

As far as I am aware, the genus *Thamala* comprises but two species, which most probably are reducible to one; *M. miniata*, Moore, occurring in Burma, and *M. marciana*, Hewitson, in Malacca, Sumatra, and Borneo. On the upperside, the male of both species is

scarlet on both wings, with the costa, apex and outer margin of the forewing black, the red portion crossed by black veins The underside of both sexes is luteous, rather paler in the female, with an indistinct darker discal line ending in a small patch of white on the abdominal margin of the hindwing. The female has the upperside of the forewing black, dull red in the middle, divided by a black streak ; the hindwing anteriorly brown, mixed with dull red, the posterior half of the wing grey. The male has two short tails, the outer one at the end of the first median nervule about one-third longer than the inner one at the end of the submedian nervure. The female has much longer tails ; the inner one is as long as the outer one in the male, while the outer one is fully three times as long.

943. **Thamala miniata,** Moore. (PLATE XXVIII, FIGS. 212 ♂, 213 ♀).

T. miniata, Moore, Proc. Zool. Soc. Lond., 1878, p. 834, pl. lii, fig. 6, *male* ; idem, id., Journ. Linn. Soc. Lond., Zoology, vol. xxi, p. 42, pl. iv, fig. i, *female* (1886).

HABITAT : Taoo, 3,500 feet, Upper Tenasserim ; Mergui ; Beeling and Moulmein, Lower Burma ; Bhamo, Upper Burma.

EXPANSE : ♂, 1·37 to 1·50 ; ♀, 1·40 to 1·50 inches.

DESCRIPTION : "MALE and FEMALE. UPPERSIDE, *both wings* deep scarlet-vermilion. *Forewing* with the base, the costal and the outer borders broadly black, confining the red colour to a circular area ; veins also black-lined, the median nervure prominently so, and forming a slight streak at the base of its branches. *Hindwing* black at the extreme base, along abdominal border, and slightly along median nervules ; exterior border narrowly black, some black speckles ascending between the first median nervule and the submedian nervure ; *tails* red, black-margined and white-tipped in the female. UNDERSIDE, *both wings* luteous-yellow in the male, ochreous-yellow in the female, with an indistinct dusky discal zigzag-lunular line terminating above the anal angle [of the hindwing] in a white-speckled patch. *Hindwing* with the *cilia* black, the margin also black-lined from the angle ; space above the tails black- and white-speckled. *Body* beneath, *legs*, and *palpi* white, speckled with black ; tip of palpi black." (*Moore*, l. c. in Proc. Zool. Soc. Lond.) Mr. Moore seems to have described two males as the opposite sexes of this species, they being very different in appearance on the upperside, but he has since correctly described the female as follows :— "FEMALE. UPPERSIDE, *forewing* dark rufescent-brown, with a large broad bright red medial patch, which nearly encompasses the black spot at the base of the median nervules. *Hindwing* with the anterior half brown, the costal border being edged with red ; lower half, including its bordering *cilia* and the *tails*, grey." (*Moore*, l. c. in Journ. Linn. Soc.)

When describing this species, Mr. Moore made no reference whatever to the "*Myrina*" *marciana* of Hewitson, described some years previously. Comparing a male of *T. miniata* with Hewitson's figure of the male of *T. marciana* and with a specimen of it from S.-E Borneo in my possession, I can discover no difference whatever. The female of *T. marciana* is shown with a small round red patch in the middle of the forewing on the upperside, but Hewitson says that the example figured was imperfect, but he describes the markings correctly. In other respects Hewitson's figure of the female is good. In my opinion, there is little doubt that *T. marciana* and *T. miniata* form but one species, but I keep Mr. Moore's species distinct till the type specimens of both species can be compared. I append a description of *T. marciana*.* Mr. W. Doherty, who knows both species in life, unhesitatingly says that they are but one species.

* *Thamala marciana*, Hewitson. *Myrina marciana*, Hewitson, Ill. Diurn. Lep., p. 34, n. 22, pl. xvi, fig. 44, *male* ; pl. xii, figs. 12, 13, *female* (1863) ; id., Butler, Trans. Linn. Soc. Lond., Zoology, second series, vol. 1, p. 549, n. 4 (1887) ; ——*marciana*, Distant, Rhop Malay., pp. 282, 465 pl. xxiii, fig. 16, *female* (1885-86). HABITAT : Malacca, Borneo (*Butler*), Sumatra and Sarawak (*Hewitson*). EXPANSE : *Male*, 1·40 ; *female*, 1·65 inches. DESCRIPTION : " MALE. UPPERSIDE, *both wings* dull scarlet. *Forewing* with the base, the costal margin, the apex, and the outer margin broadly dark brown ; the veins and a spot at the base of the median nervules black. *Hindwing* with the abdominal fold brown, the outer margin, which is narrow, and *tails* black. UNDERSIDE, *both wings* rufous, crossed beyond the middle by an indistinct interrupted brown line, both with a line at the end of the cell. *Hindwing* with two ill-defined spots at the base of the tails, the lobe, and the outer margin black ; a spot at the anal angle and a submarginal line white. FEMALE. UPPERSIDE, *both wings* rufous-brown. *Forewing* with an oblong rufous spot at the end of the cell, divided by the disco-cellular nervules, two spots (scarcely seen) between the median nervules, and a fourth rufous spot below these (forming

T. miniata appears to be a very rare species. Mr. Limborg obtained it in Upper Tenasserim, Dr. Anderson captured a pair at Mergui in December, and there is a single male in the Phayre Museum, Rangoon, taken by Major C. H. E. Adamson at Bhamo, Upper Burma, in June, 1887, which are the only specimens known to me. Lieutenant E. Y. Watson records it from Beeling in Lower Burma as rare, and Major Adamson states that he caught "numerous males and three females in the Moulmein District in April, and one in October."

Figure 212 shews both sides of a male, and figure 213 both sides of a female of this species from the Mergui Archipelago, in the collection of the Indian Museum, Calcutta.

Genus 150.—HYPOLYCÆNA, Felder. (FRONTISPIECE).

Hypolycæna, Felder, Wien. Ent. Monatsch., vol. vi, p. 293 (1862); id. (*part*), Hewitson, Ill. Diurn. Lep., p. 48 (1865); id., Moore, Journ. A. S. B., vol. liii, pt. 2, p. 29 (1884); id., Distant, Rhop. Malay., p. 255 (1885); id., Trimen, South-Afr. Butt., p. 114 (1887); *Myrina* (part), Westwood, Gen. Diurn. Lep., vol. ii, p. 475 (1852); *Amblypodia* (part), Trimen, Rhop. Afr. Aust., vol. ii, p. 226 (1866).

"MALE. FOREWING, short, broad, arched at the base, *posterior margin* nearly as long as the costal margin; a large glandular patch of scales extending broadly across the end of the cell on the upperside [in *H. erylus*, Godart, only]; with four *subcostal nervules*, the *first* emitted at two-fifths, *second* at one-fourth, and *third* from close before the end of the cell; *disco-cellular* nervule slender, straight; [*lower*] *discoidal* nervule from its middle; *discoidal cell* extending to more than half length of the wing; *first median nervule* emitted at nearly one-third, and *second* from near the end of the cell; *submedian nervure* straight. HINDWING, short, broad, somewhat produced hindwards; *anal lobe* prominent; with a slender *tail* from the end of first median nervule, and another from the submedian nervure; *costal nervure* much arched at the base; *first subcostal nervule* emitted at one-third before the end of the cell; *discoidal cell* broad, and extending to half length of the wing; *disco-cellular nervule* recurved; *discoidal* nervule from its middle; *first median* nervule emitted at nearly one-half, and *second* from near the end of the cell; *submedian nervure* straight; *internal* nervure recurved. *Palpi* porrect, second joint stout, third joint very long, of nearly the same length as the second; *legs* slender; *antennæ* with a gradually thickened club." FEMALE of *H. erylus* without the male secondary sexual character described above, the wings broader. "Type, *H. tmolus*," Felder, from the Philippines. (*Moore*, l. c.)

In *H. erylus*, Godart, the costa of the forewing is slightly arched at the base, thence straight to the apex, which is acute; the outer margin at first convex, then straight, inner angle rather acute, inner margin straight; the costal nervure ends opposite the apex of the cell, the first subcostal nervule is slightly bent upwards towards the costal nervure near its base; the base of the second subcostal nervule is about one-half the distance from the base of the first subcostal that it is from the base of the upper discoidal; the middle disco-cellular nervule originates from the upper discoidal very near its base, almost straight; lower disco-cellular also straight, slightly longer than the middle disco-cellular; the second median nervule given off a short distance before the lower end of the cell. In the hindwing the costa is much arched at base, thence straight to the apex, which is rounded; the outer margin straight, angled below the second median nervule, the abdominal margin convex, rather deeply excavated below the termination of the internal nervure; two thread-like tails of about equal length from the terminations of the submedian nervure and first median nervule; a moderate-sized anal lobe; disco-cellular nervules almost in one straight line, of equal length, outwardly oblique; the second median nervule given off immediately before the lower end of the cell; internal nervure rather long, recurved. The eyes are hairy.

Mr. Hewitson in his "Diurnal Lepidoptera" adopted Felder's genus *Hypolycæna*, but made it more comprehensive, including in it twenty-nine species, of which fourteen are African. Mr.

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together a semicircle). *Hindwing* with the base of the tails broadly grey, the outer margin and tails white."

"The figure of the female of this species was drawn from an imperfect specimen, and does not represent correctly the spots of the forewing, which I have endeavoured to rectify in the description." (*Hewitson*, l. c.)

Kirby in his "Synonymic Catalogue," pp. 406 and 782, included also twenty-eight species, of which twenty-seven are identical with those of Hewitson's list. Of these species, eight only Indian, two being admitted into the genus as herein restricted, three (or rather two, as *othona* and *eltola* are opposite sexes of one species) are here placed in another genus (*Chliaria*, Moore), *freja* is placed in the genus *Cheritra*, Moore, while *amba*, Kirby, is placed in the genus *Sinthusa*, Moore, and *etolus* becomes the type of a new genus, *Zeltus*, de Nicéville. Two species (*tharis*, Hübner, and *nilgirica*, Moore) do not appear in Hewitson's or Kirby's lists of *Hypolycæna*; the former species is in this work made the type of a new genus (*Eooxylides*), while the latter remains in *Hypolycæna*. In 1884 Mr. Moore redescribed the genus, enumerating seven species as appertaining to it. One of these, *H. andamana*, Moore, is strictly conspecific with another species, *H. erylus*, Godart; while Mr. Moore omitted from the genus his *H. nilgirica*, which he erroneously placed in the genus *Chliaria*. Of these species, now reduced to six—*H. tmolus*, Felder, from the Philippines; *H. sipylus*, Felder, from Amboyna; *H. tharrytas*, Felder, from Luzon; *H. astyla*, Felder, from the Philippines; *H. erylus*, Godart, and *H. thecloides*, Felder, both Indian—the two last are included in this work in the genus *Hypolycæna*. Mr. Distant added two species to the genus, *tharis*, Hübner, and *etolus*, Fabricius, but, as stated above, I have made each the type of a new genus, as neither species is strictly congeneric with *Hypolycæna*; the latter of these two species has lately been placed by Mr. Moore in his genus *Cheritra*, but erroneously, as in that genus the forewing has three subcostal nervules, while *etolus* has but two. This completes the list of the genus as now restricted, unless, as Mr. Distant surmises, there are a number of strictly congeneric species occurring in Tropical Africa, which should be added to it, as was done by Mr. Hewitson. Mr. Trimen in his "South-African Butterflies," takes a very comprehensive view of the genus (though he restricts it to species with two subcostal nervules to the forewing), as he includes in it species with three, with two, and with one tail. He admits five species as occurring in South Africa.

H. erylus, Godart, has a very wide range, and is certainly the commonest species of the genus where met with. *H. nilgirica*, Moore, has the most restricted range of the Indian species, occurring only in the Nilgiri hills and in Ceylon; while *H. thecloides*, Felder, is confined to Burma, the Malay Peninsula, and the Nicobar Isles; both species are rare even where they are found at all. *H. erylus* has a glandular discal patch of modified scales in the middle of the disc of the forewing on the upperside in the male, which the other species lack. This patch appears to be superficial only, and the wing-membrane to which it is attached is not affected to the extent it is in many genera of the *Lycænidæ*, in which that portion of the wing to which the modified scales are attached is raised on the under surface into a shallow projecting disc, and correspondingly depressed on the upperside. There is no sign of the membrane being affected in any way in *H. erylus*.

Key to the Indian species of Hypolycæna.

A. Male with glandular discal black patch of modified scales on upperside of forewing. Male, upperside, deep blue; female, upperside, hindwing smoky-black, with irrorated white patch at anal angle.

944. H. ERYLUS, Sikkim, Assam, Burma, Andamans, Malay Peninsula and Archipelago.

B. Males without secondary sexual characters. Males, upperside reddish-brown, glossed with purple in some lights, with orange markings at anal angle of hindwing on upperside.

a. Both sexes with markings on underside bright ochreous. Sexes alike in coloration.

945. H. THECLOIDES, Mergui Archipelago, Nicobars, Malay Peninsula.

b. Both sexes with markings of underside pale fuscous. Female, upperside, both wings dull smoky-black, with irrorated white patch on upperside of hindwing.

946. H. NILGIRICA, Nilgiris, Ceylon.

944. Hypolycæna erylus, Godart.

Polyommatus erylus, Godart, Enc. Méth., vol. ix, p. 633, n. 60 (1823); *Amblypodia erylus*, Horsfield, Cat. Lep. E. I. C., p. 111, n. 43 (1829); *Myrina erylus*, Horsfield and Moore, Cat. Lep. Mus. E. I. C., vol. i, p. 50, n. 84 (1857); *Hypolycæna erylus*, Hewitson, Ill. Diurn. Lep., p. 49, n. 1, pl. xxi, figs. 1, *male*; 2, 4,

female (1866); id., Wood-Mason and de Nicéville, Journ. A. S. B., vol. xlix, pt. 2, p. 232, n. 44 (1880); id., Moore, Journ. A. S. B., vol. liii, pt. 2, p. 30 (1884); id., Distant, Rhop. Malay., p. 255, n. 1, pl. xx, figs. 5, *male*; 6, *female* (1885); id., Staudinger, Ex. Schmett., p. 282, pl. xcvi, *male* (1888); *H. erilus*, Snellen, Tijd. voor Ent., vol. xxi, p. 23, n. 95 (1878); *H. andamana*, Moore, Proc. Zool. Soc. Lond., 1877, p. 589; idem, id., Journ. A. S. B., vol. liii, pt. 2, p. 31 (1884).

HABITAT: Sikkim, Assam, Burma, Malay Peninsula, Andaman Isles, Nias Island, Java, Borneo, Celebes, Malacca, Waigiou, Morty.

EXPANSE: ♂, ♀, 1·17 to 1·70 inches.

DESCRIPTION: "MALE. UPPERSIDE, *both wings* brown, more saturated than in the female, and covered with a very rich cyaneous blue lustre which disappears almost entirely in a certain direction to the light; a narrow border in both wings and a large discoidal spot in the forewing always preserve the original ground-colour inclining to blackish. UNDERSIDE, *both wings* silvery-gray with a faint glaucous cast; on the disc stands a short double reddish-yellow litura; behind this follows a more distinct and saturated common band of the same colour, narrowly edged on both sides with brilliant snow-white lines, nearly straight, with an oblique outward tendency in the forewing, but slightly interrupted and flexuose in the hindwing; then an angular mark resembling the letter V standing at the curve in the anal region, from which a detached line passes obliquely to the inner margin, having a fainter line parallel to it at the extreme boundary; between this band and the extreme margin passes a connected series of obsolete brown marks which is complete in the forewing and subdimidial in the hindwing, being followed in the anal region by two very large black circular ocelli separated by an intermediate oblong group of white dots, which are crowded more distinct and brilliant in an attenuated transverse streak adjoining the interior ocellus; the latter occupies the anal appendage itself, and is bordered internally by a narrow white arc, while the exterior ocellus is surrounded by a very large orange lunule; posteriorly both ocelli are bordered by a brilliant white waving marginal line, exterior to which is a black thread and gray *cilia*. *Body* brown above, hoary underneath, *abdomen* marked laterally with white bands. *Antennæ* brown with a ferruginous tip, and delicate white bands along the filiform basal portion. *Eyes* covered with a delicate ferruginous down and edged posteriorly with white. *Legs* covered with a white down and marked with black bands. FEMALE. UPPERSIDE, *both wings* brown, but the tint is without the blue lustre of the male, and is slightly clouded with grayish-brown; a saturated brown band passes a little behind the disc through both wings, being flexuose in the *hindwing*, and accompanied in the anal region by a subdimidial arched band consisting of a series of confluent broad white spots; behind this a very faint narrow band passes in a curve across the whole wing, and close to the margin is a somewhat more distinct row of spots originating at a small distance from the outer apical angle enclosed by two delicate white strigæ, being continued in the anal region by two very large deep black ocelli, encircled by white rings, while a fainter ferruginous spot covers the anal appendage; the latter also appears in the male, and a brilliant white marginal thread winds in both sexes along the anal region, exterior to which is a black marginal thread, while the wings are uniformly terminated by a grayish *cilia*." UNDERSIDE, *both wings* as in the male. (*Horsfield*, l. c.)

Hewitson describes a "Var. Female of smaller size, the forewing paler, crossed at the middle by a transverse band of dark brown, followed by a similar band of obscure white spots. Hindwing with a submarginal band of three white spots." (*Hewitson*, l. c.) The markings of both sexes are, as far as I know, particularly constant in this species. I have never seen a variety at all approaching the one described above, which is said to occur at Waigiou, Malacca, Sarawak, Celebes, and Morty.

Wherever it occurs, *H. erylus* is a very common species, the males predominating, owing probably to their habit of settling on damp spots to suck up the moisture. It has also a very wide range, from Sikkim to Upper Assam, thence southwards throughout Burma to the Malay Peninsula, and it occurs in many of the Islands of the Malay Archipelago. Mr Moore

described it from the Andaman Isles as a distinct species in 1877, and still (1884) maintains its distinctness. I can however discover absolutely nothing to separate it from the parent species in either sex. I append, however, his description of *H. andamana* for reference.*

945. **Hypolycæna thecloides,** Felder.

Myrina thecloides, Felder, Wien. Ent. Monatsch., vol. iv, p. 395, n. 3 (1860); *Hypolycæna thecloides*, Hewitson, Ill. Diurn. Lep., p. 49, n. 4, pl. xxii, figs. 9, 10, *male* (1865); id., Wood-Mason and de Nicéville, Journ. A. S. B., vol. li, pt. 2, p. 17, n. 47 (1882); id., Moore, Journ. A. S. B., vol. liii, pt. 2, p. 31 (1884); id., Distant, Rhop. Malay., p. 257, n. 4, woodcut n. 78, *male* (1885): p. 462 (1886).

HABITAT: Nicobar Isles, Mergui Archipelago, Sunjei Ujong, Singapore.

EXPANSE: ♂, 1·1 to 1·4; ♀, 1·2 inches.

DESCRIPTION: "MALE. UPPERSIDE, *both wings* fuscous. *Hindwing* two-tailed, a fulvous anal fascia. UNDERSIDE, *both wings* glaucous-whitish, a geminate discal litura and an external streak continuous on the forewing, twice refracted on the hindwing, golden circled with whitish. *Forewing* outwardly fulvescent. *Hindwing* with a concolorous subcostal spot and a pair anal black, the outer in a fulvous areole."

"Coloured like *Theclæ*, to which it is not at all unlike."

"This species and those allied to it—*Myrina* [= *Hypolycæna*] *erylus*, Godart, and [*H.*] *sipylus*, Felder—recede from *Myrina* by the shorter head to the second joint of the palpi, by the long acicular arched third joint, and by the slenderly clubbed antennæ." (*Felder*, l. c.)

"On the underside this species scarcely differs from *H. amasa* [Hewitson, = *Zeltus etolus*, Fabricius]. I have not seen its female." (*Hewitson*, l. c.)

There is hardly any difference between the sexes in *H. thecloides*. The female has the apex of the forewing somewhat truncate; in the male it is acute. The late Mr. F. A. de Roepstorff and Mr. E. H. Man have obtained it at Nankowri, Katschall, and Great Nicobar in the Nicobar Isles, and Dr. Anderson obtained a single female in the Mergui Archipelego in December.

946. **Hypolycæna nilgirica,** Moore. (FRONTISPIECE, FIGS. 123 ♂, 124 ♀).

H. nilgirica, Moore, Proc. Zool. Soc. Lond., 1883, p. 527, pl. xlix, fig. 8, *male*; idem, id., Lep. Cey., vol. iii, p 531, pl. ccx, figs. 3, 3*b*, *male*; 3*a*, *female* (1887); *Chliaria nilgirica*, id., Journ. A. S. B., vol. liii, pt. 2, p. 33 (1884).

HABITAT: Coonoor, Nilgiris; Jaffna, Northern Province of Ceylon.

EXPANSE: ♂, 1·2 to 1·3; ♀, 1·1 inches.

DESCRIPTION: MALE. UPPERSIDE, *both wings* rich reddish-brown, glossed with purple in some lights. *Cilia* ashy. *Hindwing* with three orange lunules, the anterior one very small, the two posterior ones with round black spots placed outwardly against them; a fine white anteciliary line at the anal angle; the abdominal margin pale fuscous, heavily fringed with white. UNDERSIDE, *both wings* chalk white. *Forewing* with a narrow fuscous litura closing the cell; a discal catenulated band midway between the end of the cell and the outer margin, its four upper spots rounded, the four lower ones linear and shifted inwards, a submarginal series of lunules, the margin washed with very pale fuscous. *Cilia* cinereous. *Hindwing* with a subbasal black dot above the discoidal cell; an oval intensely black subcostal spot placed

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* *Hypolycæna andamana*, Moore, Proc. Zool. Soc. Lond., 1877, p. 589; idem, id., Journ. A. S. B., vol. liii, pt. 2, p. 31 (1884); *H. erylus*, Wood-Mason and de Nicéville, Journ. A. S. B., vol. xlix, pt. 2, p. 232, n. 44 (1880). HABITAT: South Andaman Isles. EXPANSE: *Male*, 1·25; *female*, 1·37 inches. DESCRIPTION: "MALE. UPPERSIDE, *both wings* ultramarine blue. *Forewing* with a large black discal patch. *Hindwing* with abdominal margin dusky brown, the *cilia* grey, marginal anal streak and edge of tails white, anal lobe with a small reddish spot. UNDERSIDE, *both wings* greyish-blue, a brown discal transverse band, straight on *forewing*, broken and zigzag on *hindwing*, a small black anal and a red-bordered black subanal spot. FEMALE. UPPERSIDE, *both wings* brown, with an indistinct median transverse curved darker band. *Hindwing* with white marginal outer line, discal lunular marks, and three black spots from anal angle, the first golden-speckled. UNDERSIDE, *both wings* as in the male, but slightly paler greyish-blue."

"Allied to *H. erylus*, Godart." (*Moore*, l. c.)

"Absolutely indistinguishable from fresh Sikkim specimens [of *H. erylus*]." (*Wood-Mason* and *de Nicéville*, l. c.)

one-third of the length of the costa from the apex of the wing; a faint disco-cellular litura; a very irregular discal catenulated band, its upper spot just below and within the subcostal spot, the two spots which follow the largest and oval, divided by the discoidal nervule and placed nearest the outer margin, below these a very small spot placed in a line with the first spot, and then a series of fine lines recurved upwards to the abdominal margin; a fine submarginal lunular line; the anal lobe with an oval intensely black spot crowned with a narrow orange line, a similar spot on the margin in the first median interspace, the space between them irrorated with black; a fine anteciliary black line. *Cilia* sordid white. The two *tails* edged on one side and tipped with white. *Body* above and below concolorous with the wings, the thorax above richly glossed with purple in some lights. *Antennæ* black, annulated with white, the apex of the club ochreous. No secondary sexual characters. FEMALE. UPPERSIDE, *both wings* dull smoky black. *Hindwing* with four black spots on the margin towards the anal angle, the two nearest the angle large, the first or anal one of these crowned with white, the next also crowned with white, but the white colour sullied with ochreous, the other two spots small and crowned with white; a fine black and then an intensely white anteciliary line. *Cilia* white. UNDERSIDE, *both wings* marked exactly as in the male.

Near to *H. thecloides*, Felder, from Burma, the Malay Peninsula, and Nicobar Isles, the males differing from those of that species on the upperside by their richer coloration and less orange marking on the hindwing; on the underside the markings in *H. thecloides* are bright ochreous, while in *H. nilgirica* they are pale fuscous, giving a very different appearance. On the underside *H. nilgirica* appears to be very near to *H. sipylus*, Felder, from Amboyna, as figured in the 'Reise Novara,' but is quite different on the upperside.

The above description is taken from specimens captured in Ceylon by Mr. Francis A. Fairlie in July. It appears to be a rare species I have seen it from no other locality, but Mr. Hampson records that a single specimen, from which Mr. Moore first described the species, was taken by Mr. Alfred Lindsay in the Nilgiris at 1,000 feet elevation. I append Mr. Moore's description of it.* He records it from Dolosbagee, Ceylon, taken in March by Mr. F. M. Mackwood.

The figures shew both sides of both sexes of specimens in the collection of Mr. Fairlie taken at Jaffna in Ceylon.

Genus 151.—CHLIARIA, Moore. (PLATE XXVIII).

Chliaria, Moore, Journ A. S. B., vol. liii, pt. 2, p. 32 (1884).

"MALE. *Forewing*, small, triangular; *costa* gently arched; *exterior margin* oblique, *posterior margin* straight, with four *subcostal nervules*, the *first* emitted at one-third before the end of the cell, and slightly touching the costal nervure near its end, the *second* and *third* at equal distances apart; *discoidal cell* extending to nearly half length of the wing; *disco-cellular nervule* extremely slender; one *discoidal* nervule from near its middle; *second median* nervule from near the end of the cell, *first* median at one-third before the end; *submedian nervure* nearly straight. HINDWING, small, short; *apex* convex, *exterior* margin oblique and waved; *costa* arched from near the base; *first subcostal nervule* from near the end of the cell; *disco-cellular* nervule extremely slender, oblique; *discoidal* nervule from its middle; *discoidal*

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* *H. nilgirica*, Moore. DESCRIPTION. "Allied to *H.* [=*Chliaria*] *othona*, Hewitson. "MALE. UPPERSIDE, *both wings* reddish-brown. *Forewing* olivaceous-brown along the costal border. *Hindwing* with three red sub-anal marginal lunules and a white anal lobe-spot. UNDERSIDE, *both wings* greyish-white. *Forewing* with a very indistinct blackish disco-cellular lunule, a submarginal lunular line with the upper end composed of double lunules, and a marginal lunular line. *Hindwing* with a more distinct black disco-cellular lunular mark, sub-marginal and marginal lunular line, the upper end of the submarginal line composed of double lunules; a black spot on the costa near the base, and a lobe and subanal black spot, the two latter slightly yellow, surmounted with dark yellow." (*Moore*, l. c. in Proc. Zool. Soc. Lond.) "FEMALE. UPPERSIDE, *both wings* olivaceous-brown. *Hindwing* with large black subanal and less-sized marginal spots surmounted with white; intermarginal line white. UNDERSIDE, *both wings* with markings as in male. *Cilia* white." (*Moore*, l. c., in Lep. Cey.)

Mr Moore originally described this species from a male, though he stated in error that the type specimen was a female.

cell short, broad ; *second* and *third median nervules* from the end of the cell, *first* at nearly one-half before the end ; *submedian nervure* straight ; *internal* nervure recurved ; a slender *tail* from the end of the first median nervule, and another from the submedian nervure. *Palpi* porrect, second joint stout, third joint very slender ; *antennæ* with a short spatular club. Type, *C. othona*, Hewitson." (*Moore*, l. c.)

In the above description Mr. Moore treats the upper discoidal nervule of the forewing as a fourth branch of the subcostal nervure, and admits only one disco-cellular nervule. In the forewing the costal nervure is highly sinuous, and reaches to about the apex of the discoidal cell ; the first subcostal nervule is bent upwards soon after its origin, and for a short distance lies close to, but does not quite touch, a portion of the costal nervure ; the base of the second subcostal is nearer to that of the first than it is to that of the upper discoidal ; the disco-cellular nervules are almost straight, upright, the middle rather shorter than the lower ; the second median nervule originates a little before the lower end of the cell. In the hindwing the costal nervure is arched at the base, then straight to the apex of the wing ; the disco-cellular nervules are of about equal length, the upper is outwardly oblique, straight, the lower is upright but concave, the second median nervule is given off immediately before the lower end of the cell. The length of the filiform tails seem to be variable, sometimes it is the inner, sometimes the outer, which is the longer. The male has no secondary sexual characters. The eyes are finely hairy.

As restricted by me, the genus *Chliaria* contains but four species, one of which, *C. cachara*, Moore, seems to me to be very doubtfully distinct. I omit the "*Hypolycæna*" *chandrana*, Moore, and the "*Myrina*" *lisides*, Hewitson, as they both possess three subcostal nervules to the forewing, and the former has secondary sexual characters on both wings in the male, which the males of *Chliaria* entirely lack, besides possessing only one tail instead of two. Mr. Moore placed the former in 1884, and the latter in 1886, in *Chliaria*, but, as stated above, they do not agree with his diagnosis of the type species of the genus. The four species which are left in *Chliaria* are small insects, with the ground-colour of the upperside black ; in the male of *C. othona*, Hewitson, the basal half of the forewing and nearly the entire hindwing is pale blue ; the forewing glossed with rich purple-blue especially on the outer black portion in some lights ; the underside is white, with ochreous, brown, and black spots and bands. In *C. kina*, Hewitson, and *C. cachara*, Moore, the ground-colour of the upperside is also black ; in the former there is typically a small patch of bluish-white on the disc on the upperside from the base to beyond the middle of the forewing in the male, which patch in *C. cachara* is said to be much larger, and occupies all the forewing except the costa and the outer margin ; in the hindwing of *C. kina* the posterior half is similarly coloured ; in *C. cachara* the blue coloration is much more extensive. In *C. kina* in the male almost the entire surface on the upperside is glossed with a rich purple-blue suffusion ; the undersides of *C. kina* and *C. cachara* are very similarly marked to *C. othona*, but these markings are more concolorous with the ground tint and less rufous than in that species. The females of *C. othona* and *C. kina* differ widely from their respective males, being dull fuscous on the upperside without any trace of blue, the discal areas of both wings in *C. kina* being whitish, this also being sometimes the case in the female of *C. othona*. *C. merguia*, Doherty, is a very different-looking insect from the other species in the genus, though it agrees with them in structure. The upperside is black, obscurely glossed with blue ; the underside is grey, with the apical half of the forewing and the apex of the hindwing rufous, both wings crossed by a narrow discal even rufous fascia. Its resemblance on both surfaces to a very small *Hypolycæna erylus*, Godart, is very remarkable. The female is unknown.

The genus occurs in the Himalayas, Assam, the Chittagong Hill Tracts, Mergui, Bombay, and the Andaman Isles.

The transformations of no species have been described, though the larva of *C. othona*, Hewitson, has been discovered on one occasion feeding on an orchid.

Key to the species of Chliaria.

A. Both sexes, underside, both wings with the ground-colour white throughout.
   a. Both sexes, underside, both wings with markings rufous; discal band of forewing expanded anteriorly, a small round black spot on the costa towards the base of the wing.
      947. C. OTHONA, Himalayas, Assam, Chittagong Hill Tracts, Bombay, Andaman Isles.
   b. Both sexes, underside, both wings with markings concolorous with ground-colour, but darker; discal band of forewing not expanded anteriorly, of nearly equal breadth throughout.
      948. C. KINA, Himalayas, Assam.
      949. C. CACHARA, Cachar.
B. Male, underside, both wings with the ground-colour pearl-grey, the apical half of the forewing rufous, with a narrow even discal darker rufous band across both wings.
      950. C. MERGUIA, Burma.

947. **Chliaria othona,** Hewitson.

Hypolycæna othona, Hewitson, Ill. Diurn. Lep., p. 50, n. 7, pl. xxii, figs. 17, 18, *male* (1865); *Chliaria othona*, Moore, Journ. A. S. B., vol. liii, pt. 2, p. 33 (1884); id., Doherty, Journ. A. S. B., vol. lv, pt. 2, p. 129, n. 142 (1886); *Hypolycæna eltola*, Hewitson, l. c., Suppl., p. 14, n. 21, pl. v, figs. 37, 38, *female* (1869); id., Moore, Proc. Zool. Soc. Lond., 1877, p. 589; *Chliaria eltola*, id., Journ. A. S. B., vol. liii, pt. 2, p. 33 (1884).

HABITAT: Northern India, Andaman Islands (*Hewitson*); Lower Gori, Eastern Kumaon, 2,500 feet; Kapkot, North-Western Kumaon, 4,000 feet; Myitta, Tenasserim Valley (*Doherty*); Sikkim; Bhutan; Cachar; Khasi Hills; Chittagong Hills Tracts; North Canara, Bombay.

EXPANSE: ♂, ·9 to 1·2; ♀, ·9 to 1·2 inches.

DESCRIPTION: MALE. "UPPERSIDE, *both wings* pale cerulean blue. *Forewing* with the apical half rufous-brown [black]. *Hindwing* with the apex brown [black]. UNDERSIDE, *both wings* white, crossed beyond the middle by an irregular band of rufous spots commencing in a large spot at the costal margin of each wing, both with a submarginal rufous line. *Forewing* with the costal and outer margins rufous. *Hindwing* with a black spot near its base, and two black spots near the anal angle, each crowned with orange. FEMALE. UPPERSIDE, *both wings* rufous-brown, paler towards the anal angle of the hindwing. *Hindwing* with two tails, and some submarginal brown spots and a line of white below them. UNDERSIDE, *both wings* white, tinted with lilac near the base, a submarginal rufous line. *Forewing* with a line at the end of the cell, a short band beyond the middle from the costal margin, a line below it, and the apex, rufous. *Hindwing* with a rufous broken band at the middle commencing near the costal margin in a black spot, the lobe and a spot outside the tails black, bordered above with orange-yellow, the space between them irrorated with silver." (*Hewitson*, l. c.)

Mr. Doherty remarks as follows on the specimens occurring in Kumaon:—"MALE. UPPERSIDE beautifully glossed with dark blue on the *forewing* beyond the cell, seen only in certain lights. FEMALE. UPPERSIDE, the pale blue of the male replaced by a pale gray area from the hind margin of the *forewing* to the second median nervule. *Hindwing* with a similar area (without any trace of blue) extending nearly to the margin, where there is a dark subanal spot with fainter ones near it. Marginal black and white edge-lines as in the male. UNDERSIDE like the male, marks somewhat paler. *Hindwing* with the subanal black spot bordered narrowly with pale ochre. Wings wider and more rounded than in the male." (*Doherty*, l. c.)

Mr. Otto Möller possesses two females of this species from Sikkim; one, taken in March, has the posterior two-thirds of the hindwing on the upperside white, and a discal white patch on the forewing, therein agreeing with the above description by Mr. Doherty; the other specimen agrees with Mr. Hewitson's description of *C. eltola*, being entirely brown on the upperside. The Rev. Walter A. Hamilton has given me a female from the Khasi Hills, which agrees with the specimens described by Mr. Doherty. On the underside *C. othona* may be known from *C. kina* in both sexes by the markings being rufous rather than pale fuscous; the forewing having a small round black spot on the costa near the base which is absent in *C. kina*; the disco-cellular mark narrower, formed usually by a single line in the present species, but by a double line in *C. kina*; the upper portion of the broken discal band fully twice as broad,

and the outer margin broadly rufous. The females of both species may be distinguished by the markings of the underside, which agree with those of their respective males.

Males of *C. othona* occur commonly in Sikkim in March, July, and October ; the female is very rare ; I have only seen males from the Andamans, which agree absolutely with continental specimens. Mr. E. H. Aitken has sent me a single male from North Canara in the Bombay Presidency, a most unexpected locality for the occurrence of this species. Major C. A. R. Sage has reared it from a larva found feeding on an orchid hanging in the verandah of his bungalow on the Rhenok Ridge, Sikkim. The larva is green, and of the usual onisciform shape.

948. **Chliaria kina**, Hewitson. (PLATE XXVIII, FIG. 211 ♂).

Hypolycæna kina, Hewitson, Ill. Diurn. Lep., Suppl., p. 13, n. 19, pl. v, figs. 32, *male* ; 33, 34, *female* (1869) ; *Chliaria kina*, Moore, Journ. A. S. B., vol. liii, pt. 2, p. 33 (1884) ; id., Doherty, Journ. A. S. B., vol. lv, pt. 2, p 128, n. 141 (1886).

HABITAT : Masuri, Kumaon, Nepal, Sikkim, Sylhet.

EXPANSE : ♂, 1·1 to 1·5 ; ♀, 1·3 inches.

DESCRIPTION : "MALE. UPPERSIDE, *both wings* cerulean blue, the base brown [black]. *Forewing* with a small black discal spot at the end of the cell ; the costal and outer margins broadly brown [black]. *Hindwing* with two tails ; the costal margin brown [black]; the lobe and two small spots at the base of the tails brown [black]. UNDERSIDE, *both wings* blue-white, with two lines at the end of the cell, two pale submarginal bands, the outer band broken into spots. *Forewing* crossed beyond the middle by a long twice-interrupted band of seven spots. *Hindwing* with a black spot near the base, crossed at the middle by several unconnected spots. FEMALE. UPPERSIDE, *both wings* dark brown, paler on the hindwing, with a medial pale spot. *Hindwing* with some marginal spots of dark brown, and below them a line of white. UNDERSIDE, *both wings* do not differ from the male, except in having the bands and spots darker." (*Hewitson*, l. c.)

Mr. Doherty has redescribed this species from specimens taken at Loharket, 5,000 feet, N.-W. Kumaon, as follows :—" MALE. UPPERSIDE, *forewing* widely black over the apex, costa, and outer margin to the lower angle ; a large whitish discal patch (greenish or bluish in different lights, just entering the cell and extending from the submedian nervure to the third median nervule, and obscurely along the median nervure basally and the submedian nervure discally) set in the middle of an area of bright blue, only visible in some lights, and extending to the hind margin and nearly to the costa. *Hindwing* bluish-gray over the outer disc from the submedian nervure to the second subcostal nervule, and also on the abdominal margin basally. with three somewhat darker spots anally and subanally, of which that between the first and second median nervules is rather distinct ; edge-line black ; discoidal cell and the space between the subcostal nervules blue in some lights as on the forewing. *Cilia* white. UNDERSIDE, *both wings* whitish with a silky lustre, edge-line dark. *Forewing* with two transverse lines across the end of the cell, a dark discal transverse line in two parts, narrowed, and removed inwardly below the third median nervule ; two darker lines of joined lunules submarginally. *Hindwing* with a black spot near the costa basally, a double streak across the end of the cell, a dark transverse discal band broken into six pieces, that near the costa being nearly black, a submarginal line of streaks backed by a continuous irregular dark gray line, a black spot surrounded with dark ochreous between the first and second median nervules, a smaller similar spot on the lobe. FEMALE. UPPERSIDE, *both wings* black. *Forewing* with a whitish discal area most distinct between the median nervules, but extending beyond, and entering the interno-median space as a pale band. *Cilia* white, especially at the lower angle. *Hindwing*, disc with a pale area cut by dark veins, a submarginal white line, and an obscurely darker subanal spot near the margin. Both sexes have four tails, of which, unlike *C. othona*, Hewitson, the outer ones are much the shorter. My specimens agree

with Sikkim males, the Sikkim female I have not seen. They are much darker than Mr. Hewitson's figures. My two males were both taken flying in a flock of the common *Cyaniris puspa*, Horsfield, from which I could not distinguish them till I caught them. If this is a case of mimicry, it is the first, I believe, yet observed in the *Lycædinæ*." (*Doherty*, l. c.)

A rare species in Sikkim. Mr. Otto Möller possesses males taken from March to May, and in October. Colonel Lang in two years' collecting in Kumaon took only two specimens, one a female at Naini Tal at 6,500 feet on 18th May, 1887; the other a male at Saria Tal, 5,600 feet, Kumaon, on 13th May, 1888. In both cases *C. kina* was flying amongst *C. puspa*, Horsfield, with which it could easily be confounded. Mr. P. W. Mackinnon has sent me a single very small dark male taken at Masuri on 26th May, 1888, and the Rev. Walter A. Hamilton has sent me a male and two females from Sylhet. Sikkim specimens of the male are very variable in the extent of the blue area on the upperside. I possess two specimens which agree exactly on the upperside with Mr. Moore's figure and description of *C. cachara*, but on the underside the discal band of the forewing is not continuous as described in that species.

The figure shews both sides of male specimen from Sikkim in my collection.

949. **Chliaria cachara**, Moore.

Hypolycæna cachara, Moore, Proc. Zool. Soc. Lond., 1883, p. 527, pl. xlix, fig. 6, *male*; *Chliaria cachara*, id., Journ. A. S. B., vol. liii, pt. 2, p. 33 (1884).

HABITAT: North Cachar Hills.

EXPANSE: ♂, 1·12 to 1·25 inches.

DESCRIPTION: "Near to *H.* [= *C.*] *kina*, Hewitson. MALE. UPPERSIDE, *both wings* pale purplish violet-grey. *Forewing* with the costal and outer borders more narrowly pale blue-black than in *H.* [= *C.*] *kina*; no band on the posterior border, a slight spot at the upper end of the cell. *Hindwing* with the costal border slightly pale blue-black. UNDERSIDE, *both wings* greyish-white. *Forewing* with a blackish disco-cellular lunular mark, a continuous discal band, and two marginal less distinct lunular bands. *Hindwing* with a blackish disco-cellular mark, a discal band composed of three upper portions and a lower zigzag line; two marginal less distinct lunular bands and a yellow-bordered black anal and a subanal spot, a small spot also on the costal border." (*Moore*, l. c. in Proc. Zool. Soc. Lond.)

I have seen no specimen of *C. cachara*, but from Mr. Moore's figure it may perhaps be distinguished from *C. kina* and *C. othona* by the blue area of the forewing on the upperside being much more extensive, covering the entire surface except the costal and outer margins and a spot on the disco-cellular nervules, but the most distinctive character would seem to be the discal band on the underside of the forewing, which being continuous would serve to distinguish this species at once from either *C. kina* or *C. othona*, in both of which it is broken.

950. **Chliaria merguia**, Doherty.

C. merguia, Doherty, Journ. A. S. B., vol. lviii, pt. 2, p. (1889).

HABITAT: Mergui.

EXPANSE: ♂, 1·05 inches.

DESCRIPTION: "MALE. UPPERSIDE, *both wings* black, dull indigo-blue over half the forewing from the costal nervure almost to the lower angle, and over the hindwing from the first subcostal nervule to the submedian nervure, this colour is only seen in some lights; *tails* black, edged and tipped with white; *anal lobe* with a marginal white line. *Cilia* dark. UNDERSIDE, *both wings* pearl-grey, with a double reddish streak across the end of the cell, and a slender straight transverse discal brighter fulvous fascia, very slenderly bordered with blackish and whitish lines. *Forewing* with the apex widely, and the costa slenderly, light fulvous-brown, the fulvous transverse discal fascia nearly straight, unbroken, ending on the submedian nervure; an obscure darker submarginal line. *Cilia* dark. *Hindwing* mostly grey, the apex slightly tinged with rufous, the lower and anal part whitish; the fulvous transverse discal fascia dislocated inwardly below the third median nervule, and again below the

first median nervule; two submarginal lunular bands, a large black spot edged anally with orange but without metallic scales, between the first and second median nervules; *lobe* black, edged with white, a few metallic light blue scales placed outwardly against it in the interspace beyond; a slender black edge-line; *tails* much as in *C. othona*, Hewitson, the anal one longer. *Cilia* basally whitish, outwardly dark."

"A single male, Mergui. The species somewhat resembles *Zeltus etolus*, Fabricius, though easily distinguished by the short tails and the absence of the blue reflections above. It has still more resemblance to *Sinthusa amba*, Kirby. On account of the closely appressed costal nervure and first subcostal nervule I place it in *Chliaria*, though its long narrow wings give it quite a different aspect." (*Doherty*, l. c.)

This species resembles almost exactly on both surfaces the common *Hypolycæna erylus*, Godart, the coloration and markings are almost identical, but it is smaller than the smallest *H. erylus* that I have seen, though that species varies extraordinarily in size.

The seventh division that I have made in the Indian *Lycænidæ* I have called the *Myrina** group, the type of which is the *Myrina silenus*, Fabricius, an African species; it contains six genera occurring within Indian limits, and three in the Malay Peninsula; the latter so far have not been recorded from Burma, though it is not at all improbable that they may be found hereafter within the confines of that region. The *Myrina* group consists of species which have either one or the other of the tails to the hindwing over half an inch in length. The group can be split up into two subgroups; in the first, which contains two Indian and two Malay Peninsula genera, the inner tail from the end of the submedian nervure, in the second, which contains four Indian and one Malay Peninsula genus, the outer tail from the termination of the first median nervule, is the longer.

The first genus, *Zeltus*, mihi, is monotypic, and occurs in the eastern Himalayas, Assam, Burma, the Malay Peninsula and Archipelago, also in Orissa and South India. *Z. etolus*, Fabricius, has only two subcostal nervules to the forewing, all the remaining genera of the *Myrina* group having three. The male is dark indigo-blue on the upperside, brilliantly iridescent in some lights, the base of the forewing and all but the apex of the hindwing pale bluish-white. The female is dull smoky brown on the upperside, the tails and anal region of the hindwing white. The underside is marked very similarly to *Hypolycæna erylus*, Godart. The male has no secondary sexual characters.

The second genus, *Charana*, mihi, is also monotypic. *C. mandarinus*, Hewitson, is found only in Sikkim, Bhutan, and Assam; always, I believe, at low elevations. The male is very rich blue on the upperside, but more than half the area of the forewing and the costa widely of the hindwing is black. The female is dull brown on the upperside, the anal region of the hindwing irrorated with white. The markings of the underside remind one of *Tajuria jalindra*, Horsfield, and allies, but the ground-colour is pale yellow instead of white or bluish-white. The male lacks secondary sexual characters.

Neocheritra, Distant, and *Jacoona*, Distant, occur in the Malay Peninsula; the former is said to have four subcostal nervules to the forewing in the male, three in the female, as in the Indian genera *Amblypodia*, Horsfield, *Iraota*, Moore, and *Zesius*, Hübner. The male has secondary sexual characters on both wings. *Jacoona* is said to have only three subcostal nervules to the forewing in both sexes, and no secondary sexual characters are described in the male.

In the second subgroup of the *Myrina* group it is the outer instead of the inner tail to the hindwing which is the longer. The first genus, *Cheritrella*, mihi, is again monotypic, and is known only from Sikkim and Assam. The male is purple on the upperside, the hindwing of a lighter shade than the forewing, with the usual outer black borders. The female is blue not purple. The underside of both sexes is brown with some darker brown markings. The

* *Cheritra* would have been a much better name for this group, as I now find that *M. silenus* has only one tail, and *Myrina* should be used instead of *Loxura* for what I call the *Loxura* group. But the key to the genera being printed off, I cannot, without inconvenience, make the alteration now.

outer margin of the forewing being anteriorly truncated and concave makes *C. truncipennis*, mihi, recognisable at once from every other Indian species of *Lycænidæ*. The genus has no secondary sexual characters in the male.

The next genus, *Neomyrina*, Distant, contains two species only, the superb *N. hiemalis*, and *N. nivea*, Godman and Salvin. They are brilliant snow-white on the upperside, the forewing with a broad outer black border, which in the male is glossed with blue; the hindwing has a black spot on the margin in the first median interspace, the female has a dusky black outer margin. The underside is crossed, at regular intervals, by numerous catenulated bands, a little darker coloured than the ground. *N. hiemalis* occurs in Burma and the Malay Peninsula, *N. nivea*, in the Island of Billiton. The genus has no secondary sexual characters in the male.

The next genus, *Ticherra*, de Nicéville, contains one good and one doubtful species. It occurs in Northern India from Kumaon to Upper Assam, and also in Upper Burma. The male is dusky dull purple on the upperside with a narrow outer black border, the hindwing with two whitish spots on the anal region. The female is dull black above. Both sexes are sparsely marked on the underside, the ground-colour varying from bright orange to dull brownish, according to the season of the year when the butterflies appear. The tails are always more or less tinted with ochreous. The male has no secondary sexual characters.

The last Indian genus of the group is the *Cheritra* of Moore. It contains one distinct species and one doubtfully distinct local race. It is found in India, Ceylon, and the Malay Peninsula and Archipelago. The coloration of these two species is very similar to that of the species of *Ticherra*, mihi, but the male is of a duller purple on the upperside, with an extremely narrow outer black border, the tails pure white instead of being white tinged with pale ochreous. The female is dull black on the upperside, with the white spots on the anal region of the hindwing rather larger than in *C. acte*, Moore. The underside is much paler than in that species, white tinged with ochreous on the forewing anteriorly, or entirely white. The male has a small tuft of hairs on the hindwing on the upperside at the base of the costal interspace.

The genus *Ritra*, mihi, is monotypic, and occurs in the Malay Peninsula and Borneo. The male has a very large round patch of modified scales on the upperside of the forewing. It is coloured above a bright coppery, reminding one of the species of the genus *Curetis*, Hübner.

Genus 152.—ZELTUS, nov. (PLATE XXVIII).

Allied to *Hypolycæna*, Felder. FOREWING, shorter, comparatively broader; *costa* more arched, *outer margin* more convex, *inner* margin in male convex, not straight; *discoidal cell* distinctly shorter, not reaching to the middle of the wing. HINDWING, longer, narrower; *costa* shorter, *apex* at termination of first subcostal nervule very acute; *tails* broad, weak, highly ciliated ("fluffy"), the inner one at the termination of the submedian nervure fully twice as long as the outer tail; *costal nervure* much shorter, not nearly reaching the apex of the wing, its place taken by the first subcostal nervule; *internal* nervure also much shorter; *antennæ* much shorter, considerably less than half the length of the costal margin of the forewing. *Eyes* hairy. *Body* smaller and shorter. Type, *Papilio etolus*, Fabricius.

LARVA, depressed, increasing in size to the fourth segment, the anal segments dorsally flattened. PUPA, of the normal lycænid shape.

The type and only known species of this genus is a much more weakly constructed butterfly than the species of the genus *Hypolycæna*, and has a somewhat slower flight at any rate than the commonest species of that genus, *H. erylus*, Godart, which moreover occurs generally with it; it does not possess the male secondary sexual characters found in that species. The male of *Z. etolus* is deep indigo-blue on the outer two-thirds of the forewing on the upperside, with a small similar patch at the apex of the hindwing, the rest of the surface of both wings pale bluish-grey. The female is dull smoky-brown on the upperside, the hindwing with some white irrorations towards the anal angle, and two anal black spots. The underside is bluish-white, the apical half of the forewing and the apex of the hindwing ochreous-brown,

both wings crossed by a narrow discal line, a similar submarginal line, the hindwing with the two usual anal and subanal black spots. It has a very wide range.

951. Zeltus etolus, Fabricius. (PLATE XXVIII, FIG. 221 ♂).

Papilio etolus, Fabricius, Mant. Ins., vol. ii, p. 66, n. 620 (1787); *Hesperia etolus*, id., Ent. Syst., vol. iii, pt. 1, p. 264, n. 20 (1793); *Polyommatus etolus*, Godart, Enc. Méth., vol. ix, p. 639, n. 77 (1823); *Amblypodia etolus*, Horsfield, Cat. Lep. E. I. C., p. 115, n. 46; *Thecla etolus*, id., l. c., pl. i, fig. 9, *male* (1829); *Myrina etolus*, Horsfield and Moore, Cat. Lep. Mus. E. I. C., vol. i, p. 49, n. 82, pl. xii, figs 6, *larva*; 6a, *pupa* (1857); id., Butler, Cat. Fab. Lep. B. M., p. 183, n. 3 (1869); *Hypolycæna etolus*, Hewitson, Ill. Diurn. Lep., pl. xxii, figs. 19, 20, *male* (1865); id., Distant, Rhop. Malay., p. 256, n. 2, pl. xx, fig. 23, *male* (1885); id., Staudinger, Ex. Schmett., p. 283, pl. xcvi, *male* (1888); *Cheritra etolus*, Moore, Journ. Linn. Soc. Lond., Zoology, vol. xxi, p. 43 (1886); *Hypolycæna amasa*, Hewitson, l. c., p. 51, n. 8 (1865).

HABITAT: Dukhun (*Horsfield* and *Moore*); Sikkim, Assam, Orissa, the Nilgiris, the Wynaad, Travancore, Burma, Malay Peninsula, Nias Island, Java, Borneo.

EXPANSE: ♂, 1·2 to 1·5; ♀, 1·4 to 1·5 inches.

DESCRIPTION: MALE. "UPPERSIDE, *forewing* black with a bluish base. *Hindwing* light blue and silvery, with an oblong abbreviated black patch at the outer apical angle, and two circular distant subocellate black spots in the anal region. UNDERSIDE, *forewing* with the greatest portion of the surface testaceous-brown, separated by an oblique boundary from the bluish base; surface marked with a short double litura on the disc, a distinct abbreviated medial and a very faint almost complete posterior band, all these marks having a more saturated brown tint than the ground. *Hindwing* pale blue, with a whitish lustre, bearing near the base, in contact with the costa, a very distinct black dot enclosed in a faint white ring; then, behind the disc, a very delicate striga of interrupted ferruginous lineolæ, followed in the anal region by an irregularly-flexuose black line passing obliquely to the inner margin; posterior margin marked with a double series consisting of two parallel ferruginous strigæ, clouded and diffuse at the outer apical angle, attenuated towards the middle of the wing, the interior of these strigæ terminating by a distinct oblong dot between the ocellate spots, the exterior bearing a small black dot at the middle of the margin, after which follow, in the same line, two very large intensely black round ocellate spots with an intermediate group of white irrorations, which are more thickly disposed and covered with a greenish silvery cast on a black wedge-shaped dash at the edge of the inner ocellus, having its point directed towards the disc. *Body* brown above, sparingly clothed with bluish hairs, whitish and downy underneath. *Antennæ* brown, delicately annulated with white to the club, which is terminated by a ferruginous tip. *Legs* banded alternately white and black." (*Horsfield*, l. c.) FEMALE. UPPERSIDE, *both wings* dull smoky brown. *Hindwing* with the abdominal margin whitish, very hairy; the outer margin bearing, from the third median nervule to the abdominal margin, a double series of somewhat quadrate white spots, followed on the margin by a small black dot in the second median interspace, a large intensely black rounded spot in the first median interspace, from thence to the anal angle irrorated with black scales, the anal lobe marked with an oval ochreous spot, a very fine black marginal thread from the anal angle to the discoidal nervule, inwardly defined with white. Two *tails* in both sexes, white throughout in the male, the one at the termination of the first median nervule long, faintly marked with blackish down its middle in the female, the one at the termination of the submedian nervure about twice as long, more prominently marked with black, that colour disappearing towards the tip. UNDERSIDE, *both wings* marked as in the male, but the ground-colour of the costa and anterior half of the *forewing* and at the apex of the *hindwing* more ochreous than in the male. *Cilia* on the upperside of the forewing dull brown, on the underside paler; on the hindwing dull brown at the apex, from thence to anal angle pure white.

LARVA, green, hairy, depressed; head black, second and third segments increasing in size, marked with short red and black lines, the following segments of equal size, the three anal ones dorsally flattened and marked above with crimson. PUPA, of the usual lycænid

shape, yellowish-green ; head and thorax emerald-green. Described from Horsfield and Moore's figures.

I find a good deal of variation in the coloration of the underside in the males. In some specimens from South India the pale inner margin of the forewing is very sharply defined, while the basal and discal areas of the hindwing within the discal fascia are entirely testaceous ; this is the darkest form. In other specimens from Orissa and the Wynaad the testaceous coloration is almost entirely absent, being confined to the costal and outer margins of the forewing ; this is the lightest form. Almost every gradation exists between these extremes, which consequently cannot be separated off as distinct species. On the upperside also there is some variability in the extent of the bluish-white areas on both wings.

"Very common at low elevations in Sikkim. It flies rapidly, and on the wing at once reminded me of one of the common blue-bodied Dragonflies that abound everywhere near water. Is it possible that a butterfly has 'mimiced' a *Libellula* ?" (*de Nicéville*, Journ. A. S. B., vol. l, pt. 2, p. 59, n. 105, 1881).

Occurs commonly in Sikkim at low elevations in October and November, the male much more often seen than the female. As may be seen from the habitat above, *Z. etolus* has a wide range, and appears to be nowhere rare where it occurs.

The figure shews both sides of a male specimen in my collection from Sibsagar in Upper Assam.

Genus 153.—CHARANA, nov. (PLATE XXVIII).

Nearest to *Tajuria*, Moore, with which it agrees in neuration, and in the absence of secondary sexual characters in the male. Differs from it in having the inner tail to the hindwing from the termination of the submedian nervure about twice as long in the male, more than twice as long in the female, as the outer tail at the termination of the first median nervule. *Eyes* smooth. Type *Myrina mandarinus*, Hewitson.

Mr. Moore places the type species of *Charana* in the genus *Sithon*, Hübner, from which, of course, it is abundantly distinct. In the same genus he also places the *Tajuria jalindra* of Horsfield and allied species, to which *Charana mandarinus*, Hewitson, has a strong resemblance in coloration and markings. The male is black on the upperside, the lower discal areas and base blue ; the female is without any blue coloration on the upperside, but has a large patch of white towards the anal angle of the hindwing, enclosing some large black spots. The underside of both sexes is pale yellow on the basal two-thirds of the wings, the outer one-third red-brown. It is more than probable that other species will be found to belong to this genus, when the many described species of this group shall be carefully examined.

952. **Charana mandarinus**, Hewitson. (PLATE XXVIII, FIG. 222 ♂).

Myrina mandarinus, Hewitson, Ill. Diurn. Lep., p. 28, n. 4, pl. xi, figs. 6, 7, *female* (1863).

HABITAT : Sikkim, Bhutan, Assam.

EXPANSE : ♂, 1·6 to 1·8 ; ♀, 1·8 to 1·9 inches.

DESCRIPTION : " MALE. UPPERSIDE, *forewing* brown [black], with a large spot of dull cerulean blue from the base to beyond the middle, bounded by the inner margin and the first median nervule. *Hindwing* cerulean blue, the costal margin and apex broadly brown [black], one or two spots at the base of the tail, and one at the anal lobe, black. UNDERSIDE, *both wings* yellow. *Forewing* crossed beyond the middle by a triangular rufous band ; from the band to the outer margin rufous, paler, crossed by a submarginal band of rufous-brown. *Hindwing* with a broad rufous band, and a submarginal band of the same colour from the costal margin to the middle ; the caudal spot (which is crowned with orange), the spot at the anal lobe (which is crowned with bluc), some zigzag lines above them, and the outer margin, black. *Cilia* white. FEMALE. UPPERSIDE, *both wings* rufous-brown. *Hindwing* with the anal angle broadly white, marked with three large black spots, the outer margin and the middle of the ails black. *Cilia* white." UNDERSIDE, *both wings* as in the male. (*Hewitson*, l. c.)

A rare species in Sikkim, where I have taken it at a low elevation in October. It occurs both in the lower hills and in the Terai. Mr. A. V. Knyvett has taken it Jalpaiguri. The Rev. Walter A. Hamilton has obtained it in Sylhet, and at Gauhati in September, it has been recorded from the Khasi Hills, and there are specimens in the Indian Museum, Calcutta, from Buxa, Bhutan.

The figure shews both sides of a male specimen from the Khasi Hills in my collection.

I give below as foot-notes* descriptions of the genera *Neocheritra* and *Jacoona*, Distant, which occur in the Malay Peninsula.

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* Genus *Neocheritra*, Distant, Rhop. Malay., p. 252 (1885). "Allied to *Cheritra*, Moore. HINDWING, with the *costal nervure* terminating at about two-thirds of the costal margin, the *subcostal nervules* emitted a little before the end of the discoidal cell, and the position of the *tails* reversed, the long one being at the apex of the submedian nervure, and the shorter one at the apex of the first median nervule." (*Distant*, l. c.)

The diagnosis of this genus as given above seems to be very incomplete, as Mr. Hewitson states that the type species, *N. amrita*, Felder, has four subcostal nervules to the forewing in the male, three only in the female, excluding the terminal portion of the subcostal nervure, which Hewitson never reckons as a subcostal nervule; and in addition to the tuft of hairs on the forewing of the male that sex has a corresponding cup-like depression on the hindwing. None of these important characters are present in *Cheritra*; it appears to me therefore that *Neocheritra* is a particularly good genus, and very distinct indeed from *Cheritra*.

I bave seen a female specimen only of one species of this genus. Mr. Distant places two species in it, one of which, *N. gama*, Distant, bas been described from a female only, and may therefore not belong to the genus at all, as I consider the presence or absence of secondary sexual characters in the male in the *Lycænidæ* usually of generic importance, and the male of *N. gama* may not possess them, in which case the species would come into my genus *Charana*. *N. amrita* is remarkable for the great length of the inner tail to the hindwing, which as figured by Mr. Distant is 1·2 inches long in the male, rather shorter in the female. In *N. gama* it is ·4 of an inch only in lengtb. I am unable to give the geographical distribution of the genus, but it is probably confined to the Indo-Malayan region. There are several species figured by Mr. Hewitson which probably belong to it, but it would be extremely bazardous to venture to name them without having seen them.

Neocheritra amrita, Felder. *Myrina amrita*, Felder, Wien. Ent. Monatsch., vol. iv, p. 395, n. 2 (1860); id., Hewitson, Ill. Diurn. Lep., p. 27, n. 1, pl. xi, figs. 1, *female*; 2, 3, *male* (1863); id., Butler, Trans. Linn. Soc. Lond., Zoology, vol. i, p. 550, n. 7 (1877); *Sithon amrita*, Kheil, Rhop. der Insel Nias, p. 32, n. 105 (1884); *Neocheritra amrita*, Distant, Rhop. Malay., p. 252, n. i, pl. xx, fig. 15, *female*; pl. xxiii. fig. 12, *male* (1885). HABITAT: Malacca, Perak, Singapore, Nias Island. EXPANSE: *Male*, 1·6 to 1·9; *female*, 1·6 to 1·95 inches. DESCRIPTION: "Hindwing two-tailed. MALE. UPPERSIDE, *both wings* blackish-fuscous, the basal half powdered with cærulean-blue. *Hindwing* with three anal lunules, and four spots of the anal margin whitish. UNDERSIDE, *forewing* and the apex of the *hindwing* deep fulvous, the rest of the latter whitisb, with blackish spots in two series in the anal region. FEMALE. UPPERSIDE, *both wings* fuscous." UNDERSIDE, *both wings* as in the male.

"Allied to *M.* [=*Eooxylides*] *tharis*, Hübner, greater almost by half." (*Felder*, l. c.)

"This species differs in a remarkable way from the rest of the genus [*Myrina* apud Hewitson]. In the male, the inner margin of the forewing is rounded and projected outwardly, as in *Euplœa*; the middle of this margin has a tuft of long hair projecting from it at right angles, which covers a curious circular cup-like hollow spot on the opposite margin of the hindwing, the male has, besides this, a fourth branch from the subcostal nervure of the forewing." (*Hewitson*, l. c.)

"MALE. UPPERSIDE, *both wings* violaceous-blue, more or less dusted with fuscous. *Forewing* with the costal margin and rather more than the apical half black. *Hindwing* with the outer margin black, broadest at apex and containing three submarginal transverse pale spots, the two uppermost pale bluish, and separated by the second median nervule, the third white and situated between the first median nervule and the submedian nervure, where above the black margin is also a pale greyish spot, and above the third median nervule there is a discal black fascia, anal angle wbite, containing a small black spot; *tails* greyish-white, with an indistinct medial pale fuscous line; tuft of hairs at base of inner margin of forewing greyish with an ochraceous tinge. UNDERSIDE, *both wings* pale greyish. *Forewing* with the wbole cellular and outer areas pale reddish-ochraceous. *Hindwing* with the costal and apical areas pale reddish-ochraceous, with two series of black spots, one marginal and separated by the nervules commencing near the discoidal nervule, the other and preceding series consisting of three transverse spots separated by the first median nervule and the submedian nervure; *tails* with their bases blackish, and with a medial fuscous line. *Body* and *legs* more or less concolorous with the wings. FEMALE. UPPERSIDE, *both wings* fuliginous-brown. *Hindwing* with the black and white markings at the anal angular area as in the male, but with the white markings larger, or sometimes, as in the figure here given, with the white area and the black spots therein much larger; *tails* greyish-white, with prominent medial fuscous lines. UNDERSIDE, *both wings* as in the male. *Hindwing* with the black markings at anal angular area somewhat larger."

"The female figured is from Singapore and exhibits the maximum of varietal character as observed in the species, and which appears to be found in the extent of the black and white markings on the anal angular area of the upperside of the hindwing." (*Distant*, l. c.)

There is a single female specimen of this species in the Indian Musuem, Calcutta, from Perak. Mr. Butler records it from "Assam and Nepal," but almost certainly in error.

Neocheritra gama, Distant, Rhop. Malay., p. 462, n. 2, fig. 128, *female* (1886). HABITAT: Penang. EXPANSE: *Female*, 1·55 inches. DESCRIPTION: "FEMALE. UPPERSIDE, *both wings* ochraceous-brown. *Forewing* with the costal area and the apex and outer margin broadly darker brown. *Hindwing* with the anal angular, area pale greyish-white with bluish margins, and containing two blackish marginal spots separated by the first median nervule, and a smaller spot at the extreme anal angle; a marginal blackish line; *tails* greyish-white with darker medial lines. UNDERSIDE, *both wings* pale reddish-ochraceous. *Forewing* with the area beneath the median nervure and the first median nervule greyish. *Hindwing* with the anal angular greyish-white patch as above, but without the bluish margin, and inwardly containing a transverse series of five linear blackish spots, an additional small marginal spot above the second median nervule, the spot between the first median nervule and the submedian nervure much more obscure than above, and the spot at the anal angle larger and brighter, and

Genus 154.—CHERITRELLA, de N. (PLATE XXVIII).

Cheritrella, de Nicéville, Proc. Zool. Soc. Lond., 1887, p. 456.

"FOREWING, with the *costal margin* slightly and regularly arched; *outer* margin highly truncated from the apex to the termination of the third median nervule, this truncated portion, moreover, being concave; below the third median nervule to the inner angle the margin is nearly straight and oblique; *inner* margin straight. *Costal nervure* very short, not nearly reaching to opposite the apex of the cell; *first, second,* and *third subcostal nervules* at regular distances apart before the origin of the upper disco-cellular nervule, the *fourth* springing from the third about the middle of its length; *upper disco-cellular* nervule directed outwards, *middle* and *lower* upright and concave; the bases of the *second* and *third median* nervules half the distance apart of the bases of the second and first; *submedian nervure* straight.

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inwardly margined with bluish. *Body* above greyisb-brown, beneath with *legs* more or less concolorous with the wings; tarsi of legs with some blackish annulations."

"A female in the collection of Dr. Staudinger is my only knowledge of this species; the male has still to be discovered." (*Distant*, l. c.)

Genus *Jacoona*, Distant, Rhop. Malay., p. 241 (1884). "FOREWING, moderately long and subtriangular, *costal margin* strongly arched at base and then very slightly convex to *apex*, which is obtuse; *outer margin* convex, *inner margin* slightly sinuate; *costal nervure* short, terminating on the costa before the end of the discoidal cell; *first subcostal nervule* emitted about the middle of the cell and anastomosed with the costal nervure, *second* subcostal nearer to the third than to the first, *third* subcostal arising from the end of the cell, third and *fourth* bifurcating a little beyond the middle of the third; *lower disco-cellular* nervule somewhat concavely oblique; *third median* nervule at the end of the cell, *second median* about half the distance from first as from third. HINDWING, elongate, and irregularly subovate; *costal margin* with its basal third convex and then deflected and oblique to the *apex*, whicb is rounded, *posterior* margin oblique and rounded to the median nervules, where it is more or less waved and is provided with two *tails*, a short one at tbe apex of the first median nervule, and a very long one at the apex of the submedian nervure; *abdominal margin* convex; *costal nervure* reaching to about the apex of the wing; *subcostal nervules* bifurcating near the end of the cell; *third* and *second median* nervules emitted close together near the end of the cell, *first* median at about two-thirds from the base of the cell. *Body* and *legs* moderately robust; *palpi* erect, second joint raised above the level of the eyes, third joint very small and slender."

"This is probably a somewhat restricted genus, and the following species is alone known to the writer as at present belonging to it. The anastomotic condition of the costal nervure and first subcostal nervule of the forewing at once separates it from the allied genera." (*Distant*, l. c.)

The type species of the genus does not appear to possess secondary sexual characters in the male.

Jacoona anasuja, Felder. *Myrina anasuja*, Felder, Reise Novara, Lep., vol. ii, p. 237, n. 266, pl. xxx, figs. 3, 4, *male* (1865); *Jacoona anasuja*, Distant, Rhop. Malay., p. 242, n. 1, pl. xxi, fig. 15, *male* (1884). HABITAT: Malacca interior; Province Wellesley. EXPANSE: *Male*, 1·7 inches. DESCRIPTION: "MALE, forewing somewhat produced at the apex, the external margin most slightly concave, the internal margin straight, hindwing with the anal region somewhat produced, a long tail at the tip of the upper internal nervule, an acute tooth at the end of the first median nervule. UPPERSIDE, *both wings* blackish-fuscous. *Forewing* with the internal border covering the base, and an oblique fasciole beyond the cell pale cyaneous. *Hindwing* with the costal border more palely fuscous, a large internal area palely cyaneous, the internal groove and anal process whitish, with two subanal spots, the line before the cilia and the tooth black, the tail whitish. UNDERSIDE, *both wings* ochraceous-hoary, about the outermost part rufescent-brownish. *Hindwing* with the internal region, especially the anal, whitish, with eight anal black spots in a double series (the third spot of the inner sigma-shaped, the first of the outer dot-shaped, the second and fourth anal, outwardly marked with cyaneous blue somewhat larger)."

"One of the most splendid insects of the genus, known to us only by one single male specimen. It differs much from *M.* [=*Neocheritra*] *amrita*, Felder, both in the form, colour, and pattern of the wings, and also in the want of the fine mane-like hairs on the edge of the inner margin of the forewing, and of the scaleless spots on the underside, and in the stouter structure of the body, the longer abdomen, and in the neuration. The costal and subcostal nervures run close together, the latter is three-branched, the first branch anastomosing for some distance with the costal nervure, the transverse vein of the forewing obliquely directed forwards, rather waved. The lower discoidal nervule takes its rise not far from the upper one; the first two median nervules stand considerably farther apart the one from the other, as in *M. amrita*, and the costal nervure of the hindwing ends not far from the apex of the costal margin." (*Felder*, l. c.)

"MALE. UPPERSIDE, *both wings* bright violaceous-blue. *Forewing* with a broad fascia crossing the apical half of the cell and terminating a little above the posterior angle, the costal margin beyond the fascia, the apex and outer margins all blackish. *Hindwing* with the costal and posterior margins (the last as far as between the third and second median nervules) broadly blackish, after wbicb to the anal angle the posterior margin is whitish, containing a transverse black spot on each side of the first median nervule; a black outer marginal line. *Tail* whitish, more or less blackish at the base. UNDERSIDE, *forewing* pale brownish-ochraceous, more or less pale bluish-green at the base and towards the posterior angle. *Hindwing* pale bluish-green, the costal and outer margins (the last as far as the median nervules) pale brownish-ochraceous; the white anal angular patch above larger beneath, inwardly margined with a much-waved black line, and containing an additional black spot at the extreme anal angle. *Tail* beneath with a medial blackish line. *Body* and *legs* more or less concolorous with the wings."

"Of this beautiful and scarce species the writer, like Felder, is only acquainted with the male sex, and the female still remains to be discovered." (*Distant*, l. c.)

I have not seen this species. There is a remarkable difference in the length of the tail in the specimens figured by Felder and Distant, that part being in Felder's specimen ·8 of an inch long, in Distant's ·5 of an inch only. There is a considerable difference also in the outline of the forewing, Felder's specimen having the apex produced, the outer margin concave, Distant's the apex bluntly rounded, the outer margin convex. Otherwise the two figures agree fairly well.

HINDWING, with the *costal margin* strongly arched at the base, thence to apex nearly straight; *outer* margin to base of long tail at termination of first median nervule straight but waved, from thence to anal lobe at right angles; *abdominal* margin strongly convex at base, and highly excavated above the anal lobe; a short tail at the termination of the submedian nervure; *costal nervure* strongly arched at base, afterwards nearly straight; *first subcostal nervule* originating some little distance before the apex of the cell, nearly straight; *disco-cellular* nervules of nearly equal length, concave, outwardly oblique, the origin of the *third median* nervule at the lower end of the cell, the *second* just before its end, that of the *first* being fully four times as distant from that of the second as is the latter from the third, the latter traversing more than half the length of the long tail; *submedian nervure* nearly straight; *internal* nervure very short, ending on the abdominal margin above the deep excavation, and highly sinuous. *Antennæ* very short, less than half the length of the costa of the forewing; *palpi* long, porrect, almost naked, much longer in the female than in the male; *eyes* naked."

"Nearest to *Ticherra*, de Nicéville, with which it agrees in having no secondary sexual characters in the male, in the neuration of the hindwing; also in the length and position of the tails, the anal lobe, and the deep excavation above it, but differs from it in the truncation of the forewing, the costal nervure terminating long before the apex of the cell, and the fourth subcostal nervule springing from the third about its middle instead of considerably nearer the apex." (*de Nicéville*, l. c.)

When describing this genus, I adopted the formula used by Mr. Moore, I should now describe the veins of the forewing as follows:—Bases of first and second subcostals and upper discoidal nervules equi-distant, third subcostal arising from the costal nervure nearer to the apex of the cell than of the wing, long, no upper disco-cellular nervule, as the upper discoidal springs from the subcostal nervure, middle disco-cellular arising from the upper discoidal close to its base, slightly shorter than the lower disco-cellular.

Cheritrella contains but a single species, which is certainly one of the most curious of this group. It occurs in Sikkim and the Khasi Hills, and is very rare.

953. **Cheritrella truncipennis**, de N. (PLATE XXVIII, FIG. 223 ♂).

C. truncipennis, de Nicéville, Proc. Zool. Soc. Lond., 1887, p. 456, pl. xxxix, figs. 4, *male*; 3, *female*.

HABITAT: Sikkim, Khasi Hills.

EXPANSE: ♂, 1·50 to 1·60; ♀, 1·45 to 1·55 inches.

DESCRIPTION: "MALE. UPPERSIDE, *both wings* black. *Forewing* with all but the costa narrowly, and the outer margin broadly deep dull purple, with a very slight gloss in certain positions. *Hindwing* with a large, brilliantly iridescent, rich bright steel-blue* patch from the base of the wing, not reaching the outer margin, anteriorly bounded by the costal nervure, extending into the upper portion of the discoidal cell and into the upper portion of the second median interspace; the anal lobe and short tail beyond it deep ferruginous; the long tail becoming white towards its termination, pure white at its tip; an obscure round black spot between the bases of the two tails. UNDERSIDE, *both wings* umber-brown. *Forewing* with a darker brown pair of lines across the middle of the discoidal cell, another pair enclosing the disco-cellular nervules, a discal irregular fascia from the costa to the first median nervule, very broad and dark posteriorly, a submarginal series of dark dots between the veins, the inner margin very broadly pale fuscous without markings. *Hindwing* more or less covered with fuscous, dark brown, and umber fasciæ and spots, the most conspicuous of which are two black spots in the subcostal interspace, a ring-spot at the middle, and an oblong one at the end of the cell, a very dark oblique band from the middle of the abdominal margin to the middle of the wing, a discal irregular fascia recurved upwards to the abdominal margin, and a marginal dark fascia more or less sprinkled with whitish scales towards the anal angle. FEMALE.

* "Very similar to the colour exhibited on the upperside in the male of *Jamides bochus*, Cramer, but not quite so brilliant, and more purple than blue in shade."

UPPERSIDE, *forewing* with the purple area in the male replaced by a smaller pale blue patch, leaving the apical half of the wing and the outer margin at the anal angle black, a diffused white spot at the end of the cell, and another beyond it divided by the second median nervule into two portions. *Hindwing* also pale blue, all except the costa widely and the outer margin decreasingly, which are black. UNDERSIDE, *both wings* paler than in the male, but similarly marked. *Cilia* pale ferruginous throughout."

"There are single males of this very beautiful species in the collections of Major Marshall and Messrs. Otto Möller and A. V. Knyvett, and a single female in that of Mr. Möller, all of them taken in Sikkim, Mr. Möller's specimens in June. It is quite unlike any species known to me." (*de Nicéville*, l. c.) The Rev. Walter A. Hamilton has obtained a pair of this species in the Khasi Hills, the female he has generously presented to me.

The figure shews both sides of a male specimen from Sikkim in my collection.

Genus 155.—NEOMYRINA, Distant. (PLATE XXVIII).

Neomyrina, Distant, Rhop. Malay., p. 248 (1884).

"FOREWING, with the *costal margin* strongly arched; *outer* margin nearly straight; *apex* subacute; *posterior angle* rounded; *inner margin* slightly concavely sinuate; *costal nervure* short, terminating on the costal margin considerably before the end of the cell; *first subcostal nervule* emitted at about the middle of the cell and terminating on the costal margin nearly opposite [just beyond] the end of the cell, *second* subcostal emitted rather nearer the base of the third than first, *third* subcostal arising a short distance beyond [before] the end of the cell, *third* and *fourth* subcostals bifurcating at about two-thirds the length of the third; *third median* nervule from the end of the cell and emitted nearer to the second than the second is from the first, *first* median emitted fully two-thirds from the base of the median nervure. HINDWING, elongately subovate, *costal margin* oblique and very slightly convex, *apex* obtusely acute, *posterior margin* oblique, slightly waved, prominently angulated at the apex of the second median nervule, and with two *tails*, one very long at the apex of the first median nervule, the second short and slender at the apex of the submedian nervure; *costal nervure* about reaching the apex of the wing, *subcostal nervules* bifurcating about one-third before the end of the cell, *disco-cellular* nervules almost obsolete, *third* and *second median* nervules with an apparently common origin just before the end of the cell, *submedian nervure* almost straight, *internal* nervure curved and rounded inwardly. BODY short, moderately robust; *palpi* porrect, the second joint extending distinctly before the eyes, apical joint much more slender than the second, but moderately robust;" much longer in the female than in the male. *Eyes* naked.

"It is necessary to form a new genus for the following species, as *Myrina*, Fabricius, under which it was originally placed, and the type of which is the African *M. silenus*, Fabricius, possesses strongly distinct structural characters." (*Distant*, l. c.)

Neomyrina is a most distinct genus with no near Indian ally. In the forewing the costa is strongly convex, the costal and subcostal nervures lying very far apart, the costal nervure and first subcostal nervule are remarkably short, the base of the second subcostal is equidistant between the bases of the first subcostal and upper discoidal nervules, the third subcostal arises about midway between the apices of the cell and of the wing, the middle disco-cellular nervule is unusually short, thus bringing the discoidal nervules close together, the lower disco-cellular is slightly inwardly oblique and concave, the second median nervule arises some distance before the lower end of the cell. In the hindwing the upper disco-cellular nervule is very short, outwardly oblique, the lower disco-cellular is almost upright, slightly outwardly oblique, the second median nervule has its origin immediately before the lower end of the cell; the long tail is unusually broad at its base, and is traversed throughout its length by the first median nervule, the anal lobe is small, placed some little distance up the abdominal margin, its usual position being occupied by the short tail, the abdominal margin is slightly excavated above the lobe. The male has no secondary sexual characters.

As far as I am aware, *Neomyrina* contains but two species, one, *N. nivea*, Godman and Salvin, occurs in the island of Billiton, the other, *N. hiemalis*, Godman and Salvin, occurs only in Burma and the Malay Peninsula. They are of very large size, snow-white above, the forewing with the apical third black, this portion suffused with a beautiful blue colour in the male. The underside is also white, crossed by numerous slightly dusky black-margined catenulated bands. The two species are very closely allied. Mr. Doherty has observed that *N. hiemalis* frequents trees, and settles high up with closed wings on the underside of the leaves, disappearing as if by magic.

954. **Neomyrina hiemalis,** Godman and Salvin. (PLATE XXVIII, FIG. 224 ♀).

Myrina hiemalis, Godman and Salvin, Proc. Zool. Soc. Lond., 1878, p. 640, pl. xl, figs. 5, 6, *male*; *Neomyrina hiemalis*, Distant, Rhop. Malay., p. 249, n. 1, pl. xxii, fig. 13, *female* (1885); id., Moore, Journ. Linn. Soc. Lond., Zoology, vol. xxi, p. 44 (1886); *Sithon hiemalis*, Staudinger, Ex. Schmett., p. 276, pl. xcv, *male* (1888), (*S. nivea* on plate).

HABITAT: Burma, Malay Peninsula.

EXPANSE: ♂, 1·80 to 2·20; ♀, 1·65 to 2·40 inches.

DESCRIPTION: "FEMALE. UPPERSIDE, *both wings* pearly white. *Forewing* with the outer margin and a large curved apical space terminating on the costal margin at about one-third from the base, black. *Hindwing* with the posterior margin from the apex to the median nervules (where it becomes obsolete), black; an elongate black marginal spot on each side of the second median nervule; *tails* with a faint and slender medial blackish line. UNDERSIDE, *both wings* pearly white. *Forewing* with four transverse dark greyish fasciæ with still darker margins, the first two crossing the cell and terminating at the median nervure, the third and fourth wider and more irregular, situated between the end of the cell and the outer margin, and terminating near the first median nervule, marginal and submarginal dark greyish fasciæ, the colour between which is also dark greyish. *Hindwing* crossed by five irregular dark greyish macular fasciæ; the first near the base consisting of five spots, and terminating near the base of the abdominal margin, the second composed of three elongate spots, of which the lowermost two are joined, and terminate between the first median nervule and the submedian nervure, the third consists of four spots commencing beneath the second subcostal nervule and recurved and terminating on the abdominal margin, the fourth composed of six fused spots extending in an almost straight line from the costal margin to the first median nervule, and the fifth submarginal, recurved, and extending to the abdominal margin; a marginal dark greyish fascia extending from the apex to the third median nervule, followed by an elongate black marginal spot, a dark bluish spot between the second and first median nervules, two small bluish spots between that nervule and the submedian nervure, and a large bluish spot shaded with black at the anal angle, above which the submarginal fascia is also tinged with bluish; *tails* as above; *body* above pale greenish, beneath with *legs* more or less concolorous with the wings. MALE (figured and described in error as a female by Messrs. Godman and Salvin) differs from the female in having the apical area of the UPPERSIDE of the *forewing* bluish, the outer margin only being black; the posterior margin of the *hindwing* is also only slightly marked with blackish. UNDERSIDE, *both wings* as in the female." (*Distant*, l. c.)

Dr. J. Anderson met with this most beautiful species at Mergui in December and March, and at Thapo and Yimiki, King Island, and at Sullivan Island, all in the Mergui Archipelago, in January and February. The type specimen was captured at Meetan in Upper Tenasserim, and the late Herr Künstler obtained it at Perak. The only other known species of the genus, *N. nivea*, Godman and Salvin, which occurs on Billiton Island, differs from *N. hiemalis* in the male on the upperside of the forewing in the black blue-suffused apical portion being evenly curved and narrower, not twice prominently indented as in *N. hiemalis*, and in the bands of the underside being less distinct and pure white, instead of enclosing a greyish space.

The figure shews both sides of a female specimen from the Mergui Archipelago in the collection of the Indian Museum, Calcutta.

Genus 156.—TICHERRA, de N. (PLATE XXVIII).

Ticherra, de Nicéville, Proc. Zool. Soc. Lond., 1887, p. 457.

"Closely allied to *Cheritra*, Moore, but differs in the male in the absence of the secondary sexual characters on the costal margin of the hindwing on the upperside; the third subcostal nervule of the forewing springing from the costal nervure much nearer its apex, consequently being shorter; the discoidal cell of the hindwing longer, the disco-cellular nervules being much more outwardly oblique."

"Type, *Ticherra acte*, Moore." (*de Nicéville*, l. c.)

Two species only come into this genus as far as I can ascertain. *T. acte* is a common Himalayan species, occurring also in Assam and Upper Burma. *T. symira*, Hewitson, is probably an aberration of *T. acte*, and was described from Sikkim. In *T. acte* a very marked seasonal dimorphism occurs, the form on the wing during the rains has a brilliant orange underside, whilst that found in the dry-season, when the vegetation is much more scanty and arid, is of a brownish hue, closely simulating the shade of a dead leaf. Mr. Doherty notes on this subject: "The very distinct dry-season form, non-ocellate and dusky fuscous below, was first seen in November" at Margherita, in Upper Assam.

Key to the species of Ticherra.

A. Upperside, hindwing with two or three prominent white spots towards the anal angle.
  955. T. ACTE, Kumaon, Sikkim, Bhutan, Assam, Upper Burma.

B. Upperside, hindwing marked with two black spots only, the white spots of *T. acte* entirely wanting.
  956. T. SYMIRA, Sikkim.

955. Ticherra acte, Moore. (PLATE XXVIII, FIG. 225 ♂, WET-SEASON FORM).

Myrina acte, Moore, Horsfield and Moore, Cat. Lep. Mus. E. I. C., vol. i, p. 47, n. 77, *female* (1857); id., Hewitson, Ill. Diurn. Lep., p. 30, n. 10, pl. xii, figs. 8, 9, *male*, *wet-season form* (1863); *Cheritra acte*, Doherty, Journ. A. S. B., vol. lv, pt. 2, p. 127, n. 134 (1886); *Ticherra acte*, de Nicéville, Proc. Zool. Soc. Lond., 1887, p. 457, pl. xl, fig. 5, *male*, *dry-season form*; *Sithon acte*, Staudinger, Ex. Schmett., p. 277, pl. xcv, *male*, *wet-season form* (1888).

HABITAT: North India (*Moore*), Kumaon, Sikkim, Bhutan, Assam, Upper Burma.

EXPANSE: ♂, 1·2 to 1·8; ♀, 1·4 to 1·8 inches.

Wet-season form.

DESCRIPTION: FEMALE. "UPPERSIDE, *both wings* dark smoky-brown. *Hindwing* with three spots of white near the anal angle, *tail* and anterior margin whitish. UNDERSIDE, *both wings* reddish chrome-yellow, with an indistinct undulating line crossing the wings, terminating abdominally on the *hindwing* in separate lighter spots, near the anal angle brownish, with two black spots bounded anteriorly with metallic blue." (*Moore*, l. c.) MALE. UPPERSIDE, *both wings* dark purple, the outer margin narrowly black. *Hindwing* with the anal angle broadly black, bearing inwardly two small white spots divided by the first median nervule, four short white lines on the margin between the veins from the third median nervule to the anal angle. Two *tails*, which are blackish towards the base, then suffused with ochreous, with a dark middle line, quite white towards the tip. *Cilia* of the forewing black, of the hindwing ochreous anteriorly, whitish-ochreous posteriorly. UNDERSIDE, *both wings* coloured and marked as in the female.

The figure shews both sides of a male specimen of the wet-season form from Bhutan in my collection.

Dry-season form.

"MALE and FEMALE. UNDERSIDE, *both wings* differ from the typical rainy-season form in the ground-colour being cinnamon-brown instead of rich ochreous-orange; the markings in the discoidal cells and the fine linear discal fasciæ are also much more prominent." *Hindwing* with the two black spots at the anal angle and the silvery blue metallic line above them obsolete.

"Described from specimens from Sikkim, Assam (Shillong), and the Dafla Hills. I considered these specimens at first to constitute a species distinct from *T. acte*, but Mr. Otto Möller pointed out to me that all his dated specimens with the orange underside were captured in Sikkim during the rainy months, while all those with brown-coloured undersides were taken in either the spring or autumn, so I have but little doubt that this is another case of the extensive seasonal dimorphism which takes place in many of the *Lycænidæ* occurring in the oriental tropical and subtropical regions." (*de Nicéville*, l. c.)

The two forms described above are the extremes, but intermediate forms are by no means uncommon. Mr. Doherty records it from "Askot, 5,000 feet, Baghrihat, 2,500 feet, Eastern Kumaon, scarce," which is probably its most easterly range; it is very common in Sikkim and Bhutan at low elevations, and occurs in March, May, October and November, probably also in all the intermediate months; it is found also throughout Assam, and the Phayre Museum, Rangoon, possesses a female specimen captured at Tsenbo, Upper Burma, in May. Mr. Doherty obtained several specimens in Upper Tenasserim, and writes of a female specimen from Myitta, Tenasserim Valley, that it is "remarkable in having the white spots on the lower part of the hindwing united into a short very broad band such as occurs in some specimens of *Cheritra freya*" [=*freja*, Fabricius].

956. **Ticherra symira**, Hewitson.

Myrina symira, Hewitson, Ent. Month. Mag., vol. xiii, p. 152 (1876); idem, id., Ill. Diurn. Lep., Suppl. p. 26, n. 72, pl. iii*b*, figs. 107, 108 (1878); idem, id., Desc. new Ind. Lep. Ins. Coll. Atkinson, p. 3 (1879).

HABITAT: Sikkim.

EXPANSE: 1·1 inch.

DESCRIPTION: "UPPERSIDE, *both wings* brown, tinted with purple, the outer margin dark brown. *Hindwing* with the anal angle dark brown, with two tails, a long one in continuation of the first median nervule and a short one inside of it. UNDERSIDE, *both wings* rufous-orange. *Hindwing* with a black spot crowned with silvery-blue at the base of each tail." (*Hewitson*, l. c. in Ent. Month. Mag.)

As Mr. Hewitson's later description differs somewhat from the above, I give it below as a foot-note.* He does not give the sex of the specimen he described, it was probably a male, as he says it is tinted with purple on the upperside. I think it most probable that this species is one of the protean forms of *T. acte*, Moore, most likely an aberration or "sport" of the rains' form of that species. It entirely lacks the two white spots on the anal area of the hindwing on the upperside present in *T. acte*, a variable feature in that species, some specimens having them very large, others very small.

Genus 157.—CHERITRA, Moore. (PLATE XXIX).

Cheritra, Moore, Lep. Cey., vol. i, p. 109 (1881); id., Distant, Rhop. Malay., p. 250 (1885).

"FOREWING, triangular; *costa* uniformly arched to the tip, *exterior margin* oblique, *posterior* margin straight; *first subcostal nervule* emitted at one-half, *second* subcostal at one-third, before the end of the discoidal cell, *third* subcostal immediately before the end, *fourth* subcostal at two-thirds from below the third and terminating at the apex, *fifth* subcostal from a slight angle at the end of the cell; *disco-cellular* nervules slightly waved, *lower discoidal* nervule from their middle; *discoidal cell* very broad, long, extending to more than half the wing; *second median nervule* from close to the end of the cell; *first* median at one-third before the end; *submedian nervure* slightly waved. HINDWING, short, broadly truncate hindwards; *costa* much arched at the base and very oblique to the apex; *exterior margin* angled at the ends of the third and [second] median nervules, with a very long *tail* from the

* "UPPERSIDE, *both wings* brown tinted with purple, the outer margin dark brown. *Hindwing* with two tails and two caudal black spots. UNDERSIDE, *both wings* rufous-orange, crossed beyond the middle by an indistinct linear brown band. *Hindwing* with the lobe and caudal spot black, crowned with blue." (*Hewitson*, l. c. in Ill. Diurn. Lep.)

first median nervule and a short one from the submedian nervure; anal angle excavated above the lobe. Male with a tuft of fine hair covering a glandular patch between the base of the costal and subcostal nervures; *costal nervure* arched at the base; *first subcostal nervule* at one-third before the end of the cell; *disco-cellular* nervules outwardly oblique, *discoidal* nervule from their middle; *discoidal cell* broad; *second median nervule* from immediately before the end of the cell, *first* median at nearly one-half before the end; *submedian nervure* nearly straight; *internal* nervure much recurved. BODY moderate; *palpi* porrect, second joint long, squamose, extending half length beyond the head, third joint one-fourth its length, slender; *legs* squamose, short; *antennæ* gradually thickened to the end, tip pointed, Type, *C. jafra*," Godart [=*C. freja*, Fabricius]. (*Moore*, l. c.)

In the forewing the costal nervure terminates opposite to the apex of the discoidal cell; the base of the second subcostal nervure is nearer to the base of the first subcostal than it is to the base of the upper discoidal; the third subcostal originates just midway between the apices of the cell and of the wing; the middle disco-cellular nervule springs from the upper discoidal close to its base, is a little shorter than the lower disco-cellular, and is slightly concave; the lower disco-cellular is nearly straight, both are upright; the second median nervule originates near the lower end of the discoidal cell; the inner margin is distinctly sinuous, being excavated in the middle. In the hindwing of the male is a brush of dark hairs springing from the base of the subcostal nervure and lying anteriorly across the subcostal interspace, and there is a small glandular oval white patch of scales beneath the area covered by the hairs, as stated by Mr. Moore. The palpi in the female are much longer than in the male. The eyes are naked.

As far as I am aware, this genus contains but two species, or perhaps it would be better to say, one species and a local race. It occurs in the north-east of India, Burma, the Malay Peninsula, and in two of the Malay islands, and again in South India and Ceylon. It is probably only to be found in forests, and frequents the lower trees and bushes. The great length of its pure white tails makes it a conspicuous object on the wing. Its flight is not very rapid. It has two well-marked seasonal forms in Northern India.

Key to the species of Cheritra.

A. Underside of forewing and outer margin anteriorly of hindwing washed with ochreous.
957. C. FREJA, Kumaon, Bhutan, Assam, Burma, Malay Peninsula, Java, Borneo.
B. Underside of both wings almost entirely white.
958. C. JAFFRA, South India, Ceylon.

957. Cheritra freja, Fabricius.

Hesperia freja, Fabricius, Ent. Syst., vol. iii, pt. i, p. 263, n. 19 (1793); *Myrina freja*, Butler, Proc. Zool. Soc. Lond., 1867, pp. 34, 36, figs. 1, 1*a*, *female*; idem, id., Cat. Fab. Lep. B. M., p. 183, n. 2 (1869); id., Moore, Proc. Zool. Soc. Lond., 1878, p. 834; *Sithon freja*, Druce, Proc. Zool. Soc. Lond., 1873, p. 351, n. 3; id., Staudinger, Ex. Schmett., p. 277, pl. xcv, *male* (1888); *Cheritra freja*, Distant, Rhop. Malay., p. 251, n. 1, pl. xx, fig. 10, *female* (1885); id., Moore, Journ. Linn. Soc. Lond., Zoology, vol. xxi, p. 43 (1886); *Myrina jaffra*, Godart, Enc. Méth., vol. ix, p. 593, n. 1 (1823); id., Horsfield, Cat. Lep. E. I. Co., p. 118, n. 48 (1829); id., Lucas, Lep. Ex., p. 85, pl. xliii, fig. 4, *female* (1836); *Cheritra jafra*, Doherty, Journ. A. S B., vol. lv, pt. 2, p. 127, n. 135 (1886); *Myrina jaffra*, Horsfield, Cat. Lep. E. I. Co., pl. ii, figs. 5, 5*a*, *female imago*; 5*b*-*e*, *structure of imago* (1829); id., Guérin-Méneville, Icon. Règ. An., Ins., p. 489, pl. lxxxi, figs. 3, *female imago*; 3*a*-*e*, *structure of imago* (1844); id., Marshall and de Nicéville, Butt. of India, vol. i, pl. i, *structure of imago* (1882).

HABITAT: Tranquebar (*Fabricius*), Kumaon, Bhutan, Assam, Burma, Malay Peninsula, Java, Borneo.

EXPANSE: ♂, 1·5 to 1·9; ♀, 1·4 to 2·0 inches.

DESCRIPTION: "MALE. UPPERSIDE, *both wings* blackish-brown, covered with a beautiful saturated cupreous gloss slightly varying to purple. *Forewing* immaculate. *Hindwing* with the anal extremity black separated by a regularly transverse boundary, marked with two white spots, one large, lunulate and marginal, the other oblong, narrow, and exactly opposed to the exterior one at the inner boundary of the anal region; a short white line at the extreme inner margin near the base, indicating the interior attachment of a small brush-like appendage. UNDERSIDE, *both*

wings white with a grayish shade covered with a slight lustre. *Forewing* has the exterior [costal] and posterior [outer] borders ferruginous, the tint being faint and diffuse interiorly, but more intense in contact with the margin ; a very delicate discoidal line, a complete undulated striga behind the disc composed of interrupted lineolæ, and a very obsolete row of spots within the posterior margin are of the same colour. *Hindwing* has beyond the disc a very delicate black striga composed at the costal extremity of interrupted lunules, and in the anal region of arcuated marks disposed in regular succession ; then follows a delicate interrupted streak passing in a curve over the entire surface of the wing, and exteriorly of this, just within the margin in the costal [outer] extremity, a macular series of four oblong obsolete brown spots followed by five diversified spots of an intense black tint pervading the anal region ; the extreme ones on each side being linear, the next adjoining interiorly large, angular, subocellated, one of them being situated in the marginal series near the notch, the other on the anal appendage ; the fifth, which is oblong and somewhat removed from the margin, occupies the medial space of the anal region ; these spots are all covered along their inner edge by marks corresponding to their individual form of greenish silvery atoms, forming by their union an undulated streak passing along the inner boundary of the anal region. *Body* above and underneath agrees in colour with the adjoining portion of the wings. *Legs* white with distant white [black] bands, but the tarsi are closely banded. *Antennæ* brown, with a faint grayish crenulation along the inner groove. *Eyes* edged with white. *Palpi* beneath white. *Tails* white with a black medial streak. FEMALE. UPPERSIDE, *forewing*, immaculate. *Hindwing* with a broad snow-white band separating the anal from the middle region ; it consists of three oblong spots, of which the exterior one is narrow and passes obliquely towards the margin ; a very large lunule of the same colour occupies at the margin the extreme space between the tails." (*Horsfield*, l. c.) The FEMALE may at once be known from the male on the upperside of both wings by lacking entirely the beautiful purple gloss which is visible in certain lights in the male, as well as by the much greater size of the white markings towards the anal angle of the hindwing.

Mr. Doherty records this species from "Jhulaghat, Gori, and the Kali Valleys, 2-3,000 feet," all in Kumaon. I was previously unaware of *C. freja* being found to the west of Bhutan, where it is common, though it may occur in the Sikkim tarai. It occurs throughout Assam, in the Chittagong Hill Tracts, through Burma to the Malay Peninsula, and in Java and Borneo.

958. **Cheritra jaffra**, Butler. (PLATE XXIX, FIG. 226 ♂).

Myrina jaffra, Butler, Proc. Zool. Soc. Lond., 1867, pp. 34, 36, figs. 2, 2*a*, *female* ; *Cheritra pseudojafra*, Moore, Lep. Cey., vol. i, p. 110 (1881).

HABITAT : Kanara, Karwar, Western slopes of the Nilgiris, Wynaad, Travancore, Ceylon.

EXPANSE : ♂, 1·6 to 1· ♀, 1·5 to 1·8 inches.

DESCRIPTION : FEMAL . "Differs from *C. freja*, Fabricius, in having the subanal black band on the UPPERSIDE of the *hindwing* nearly divided in the middle, thus forming two quadrate spots ; on the UNDERSIDE [of both sexes] it differs in the almost entire absence of yellow colouring in the *forewing*, and in the addition of a small intermacular subanal spot [in the submedian interspace] in the *hindwing*." (*Butler*, l. c.)

Of the characters given above as distinguishing this species, I find that the coloration of the underside is the only constant one, all the rest being variable. This single character is very slight, and it would perhaps be better to have treated *C. jaffra* as a local race only of *C. freja*. I do not understand how Mr. Moore could have described *C. pseudojafra* as a distinct species. My Ceylon specimens are identical with South Indian ones of *C. jaffra*. Its description is appended.* I am not certain if Mr. Butler intended his name to stand for this

* *Cheritra pseudojafra*, Moore, Lep. Cey., vol. i, p. 110 (1881). HABITAT : Ceylon. EXPANSE : *Male*, 1·6 ; *female*, 1·7 inches. DESCRIPTION : "MALE. UPPERSIDE, *both wings* purplish violet-blue, olivaceous-brown

species or for the *jafra* of Godart. The latter is clearly synonymous with *C. freja*, but as Mr. Butler has spelt this name differently to what Godart did, it can be retained for his (Butler's) species.

The figure shews both sides of a male specimen of this species from Ceylon in my collection.

I give below a description of a remarkable genus and species occurring in the Malay Peninsula and Borneo.*

The eighth division that I have made in the Indian *Lycænidæ* I have called the *Horaga* group ; it contains six genera within Indian limits, and one in the Malay Peninsula. In this group of genera both sexes of all species have three tails to the hindwing. They can be split up into two subgroups each containing three Indian genera. The first has the middle tail short, under a quarter of an inch in length, all the tails filiform and not ciliated ; the forewing with two subcostal nervules only. The second subgroup has the middle tail longer, over a quarter of an inch in length, and all the tails strongly ciliated ; one genus has three subcostal nervules to the forewing, the other two genera have two only. It is probable that all the genera are strictly oriental, although it is possible that some of them may be found in Africa.

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in some lights ; marginal line black. *Hindwing* witb a large anal black patcb bordered above and below by slender white lunules. *Cilia* and *tail* white. UNDERSIDE, *both wings* entirely white. *Forewing* with a very indistinct slender black discal broken line and linear submarginal line. *Hindwing* with a similar slender discal and submarginal sinuous line, and marginal lunules ; a large inner and outer anal black spot and two smaller intervening spots, each speckled with metallic-green scales. FEMALE. UPPERSIDE, *both wings* violet-brown, with broad white borders to black anal patch." UNDERSIDE, *both wings* as in the male. (*Moore*, l. c.)

" Kornegalle and Lower Ambegamoa. Scarce " (*Mackwood*).

* Genus *Ritra*, nov. Allied to *Cheritra*, Moore. Male differs in the outer margin of the forewing being slightly concave not straight, and in having a large round silky patch of scales differently formed to those on the rest of the wing in the middle of the wing, the patcb occupying tbe outer end of the cell, bounded posteriorly by the first median nervule, anteriorly by tbe upper discoidal nervule. Type, *Sithon aurea*, Druce.

As far as I am aware, this genus contains but a single species, which occurs in Borneo and the Malay Peninsula, and of wbich tbe male alone is known. On the upperside it is coloured just like a male *Curetis*, Hübner, being of an orange-coppery sbade, the forewing with the large silky patch above described concolorous with tbe rest of the wing, but noticable at once by the scales of which it is formed catcbing the light in different directions ; it is also strongly visible when the butterfly is beld up to the light owing of tbe opacity of the scales. The hindwing has the anal region white, marked with two black spots, the tails white, with a black medial line.

Ritra aurea, Druce. *Sithon aurea*, Druce, Proc. Zool. Soc. Lond., 1873, p. 352, n. 12, pl. xxxiii, fig. 1, *male*. HABITAT : Perak, Borneo. EXPANSE : *Male*, 1·12 (*Druce*), 1·55 to 1·80 inches. DESCRIPTION : " MALE. UPPERSIDE, *both wings* dark orange. *Forewing* with a silky spot at the end of the cell. *Hindwing* with the anal angle, which is marked with two black spots, and the *tail* white with a black centre. UNDERSIDE, *both wings* sooty-brown. *Hindwing* with the posterior half white crossed by two broken black bands, the lower one slightly marked with blue. Allied to *Myrina orpheus*, Felder," from Luzon. (*Druce*, l. c.)

On the upperside both wings have a fine anteciliary black line on the outer margin, the cilia of the forewing black, of the hindwing white. On the underside the inner margin of the forewing is paler than the rest of the wing, in the hindwing the outer series of black spots are centred with metallic blue, and there is a fine anteciliary fuscous line.

There is a single male of the species captured by the late Herr Künstler in Perak in the collection of the Indian Museum, Calcutta. The species is not included in Mr. Distant s " Rhopalocera Malayana," this specimen was sent to him, but he returned it unnamed, stating that as the tails were wanting it would be better to await the receipt of a perfect specimen before identifying it. I have but little doubt, however, that I have correctly named the specimen. The *M. orpheus* of Felder, from the Philippines, is quite a distinct species, and moreover apparently lacks the male sexual patch of scales on the forewing, and, therefore, in my opinion, should be placed in a different genus Its description is appended.*

* " *Myrina*" *orpheus*, Felder, Wien. Ent. Monatsch., vol. vi, p. 292, n. 59 (1862) ; id., Hewitson, Ill. Diurn. Lep., p. 30, n. 8, pl. xvi, fig. 45, *female* (1863) ; *M. massiva*, id., l. c., pl. xii, figs. 10, 11, *male*. HABITAT : Luzon. EXPANSE : *Male*, 1·7 ; *female*, 1·6 inches. DESCRIPTION : " Hindwing with two tails, the outer tail much the longer. UPPERSIDE, *both wings* fuscous, shining in certain lights with bronze and purple in the male, the veins and the margin of a delicate copper-yellow, the forewing of the female yellowish-brown on the disc. *Hindwing* in both sexes black in the anal region, in the male with two spots, in the female with three much larger spots marked with white. UNDERSIDE, *both wings* whitish, margined with yellow. *Hindwing* with a very oblique macular streak, and with three shapeless spots in the anal region, sprinkled with metallic leaden-green atoms, beyond this, black."

" This extraordinary species has the size of *M. jaffra*, Godart. On the *underside* it is very like *M.* [*Neocheritra*] *amrita*, Felder, from Malayana, but it differs much from it in the straightness of the wings, in the arrangement of the veins, and the form of the palpi. As regards the branching of the subcostal nervure of the forewing, it is allied to *M.* [*Tajuria*] *longinus*, Fabricius (which we referred to erroneouly as *pseudolonginus* in our Lepidoptera Malayica, in Wien. Ent. Monatsch., vol. iv, p. 395), but really it has palpi extremely like those of *M.* [*Eooxylides*] *tharis*, Hübner. We have seen two females and one very lovely male specimen collected by Mrs. Anna Semper." (*Felder*, l. c.)

The first genus, *Rathinda*, Moore, is monotypic, and is found in India and Ceylon only. The opposite sexes in *R. amor*, Fabricius, are marked very much alike, they are brown on the upperside, with an oblique discal white or ochreous band on the forewing, the underside very beautifully variegated. The male has no secondary sexual characters.

The second genus, *Horaga*, Moore, contains about ten species, which occur in India, Ceylon, the Andaman Isles, the Malay Peninsula and Archipelago. The males are usually black on the upperside, the lower discal and basal areas of the forewing and nearly the whole of the hindwing except the margins are blue, the forewing always has a patch of pure white on the middle of the disc. On the underside this patch is usually continued across the disc of the hindwing as a band of varying width. Some of the species have secondary sexual characters in the male, which others have not.

The third genus, *Catapœcilma*, Butler, contains two species only; one occurs in India, Ceylon, the Malay Peninsula and Archipelago, the other so far has been found in Sikkim only. The male of *C. elegans*, Druce, is dark purple on the upperside, with narrow outer black borders. The female has the disc of both wings blue on the upperside, the rest of the surface black. The underside is most beautifully marked with numerous bands and spots, some of which are coloured exactly like mother-of-pearl. The other species, *C. delicatum*, de Nicéville, has the male almost entirely black on the upperside, the female is blue like that sex of *C. elegans*, the underside densely striated with yellow and black, with numerous metallic green spots scattered over the surface. The males have no secondary sexual characters.

The genus *Semanga*, Distant, is monotypic, and occurs in the Malay Peninsula and Borneo. It has an extra (third) subcostal nervule to the forewing. On the underside of the hindwing it resembles *Catapœcilma* in having metallic markings on the anal area. The female sex alone appears to be known. It is unique as regards the points from which the tails of the hindwing arise, *i.e.*. each from the apex of a median nervule.

In the next subgroup all the genera have the middle tail long and highly ciliated instead of thread-like, and all the genera possess secondary sexual characters in the male. The first genus, *Biduanda*, Distant, has three subcostal nervules to the forewing, and the secondary sexual characters consist of a glandular patch of modified scales on either side of the base of the first subcostal nervule of the hindwing. The genus is found in Sikkim, Burma, the Malay Peninsula and Archipelago. Six species are known to belong to it.

The next genus, *Drupadia*, Moore, contains but three species, two of which are, in my opinion, probably reducible to one. The genus occurs in Burma, doubtfully in the Nicobar Isles, and in the Malay Peninsula and Archipelago. They are very beautiful butterflies, the forewing of both sexes of the Indian species with a very broad rich orange discal patch, the rest of the wing black, the hindwing in the male blue, in the female black; on the underside the forewing is orange with darker bands and spots; the hindwing is anteriorly orange posteriorly white, with blackish bands and spots, and some metallic markings towards the anal angle. Some of the species of the preceding genus are very similarly marked on the underside. The forewing has two subcostal nervules only, and the male has a glandular patch of modified scales on either side of the submedian nervure near the base of the wing on the underside, below which the inner margin of the wing is outwardly bowed; there is also a similiar patch of scales in the subcostal interspace of the hindwing on the upperside.

The last genus of the group is *Eooxylides*, mihi, and is monotypic. Both sexes have two subcostal nervules to the forewing, this in the male bears a glandular discal patch of scales on the upperside, the inner margin of the wing straight. *E. tharis*, Hübner, is rather a plain insect, the upperside is dark purplish-fuscous, the forewing unmarked, the hindwing with some white patches towards the anal angle, the underside rich orange, the anal third of the hindwing white marked with black. *E. tharis* is found in Burma, and in the Malay Peninsula and Archipelago.

Genus 158.—RATHINDA, Moore. (PLATE XXIX).

Rathinda, Moore, Lep. Cey., vol. i, p. 99 (1881).

" Wings, small. FOREWING, short, triangular ; *costa* arched in the middle, *exterior margin* slightly convex ; *costal nervure* very short [normal in length], not extending to quite half the wing ; *first subcostal nervule* emitted at half the length of the cell, *second* at one-third, and the *third* at one-fifth before the end, *fourth* from the end of the cell ; *disco-cellular* nervules nearly erect, *radial* from their middle ; *discoidal cell* extending to more than half the wing ; *second median nervule* at one-sixth, *first* median at one-fifth before the end of the cell ; *submedian nervure* slightly waved. HINDWING, short, broadly oval, *exterior margin* indented above the end of the third median nervule and thence broadly lobular to the anal angle ; both sexes furnished with three slender *tails* ; *costal nervure* arched at the base ; *first subcostal nervule* at one-fourth before the end of the cell ; *disco-cellular* nervules recurved, *radial* from their middle ; *discoidal cell* broad ; *second median nervule* at one-sixth, *first* at one-third before the end of the cell ; *submedian nervure* straight, *internal* nervure recurved. BODY, moderate, *abdomen* extending to anal angle [in the male only, much shorter in the female] ; *palpi* very long, porrect, slender, second joint extending two-thirds beyond the head, third joint one-third length of second ; *legs* squamose ; *antennæ* with a gradually-thickened club. Type, *R. amor*, Fabricius." (*Moore*, l. c.)

LARVA, cylindrical, armed with numerous curved upright tubercles of varying length. PUPA, normal.

In Mr. Moore's description above it will be observed that, in speaking of the forewing, he treats the upper discoidal as a fourth subcostal nervule, and terms the lower discoidal the radial nervule. In the forewing the costa is considerably arched, the costal nervure and subcostal nervules lying far apart ; the costal nervure extends to about opposite to the apex of the discoidal cell ; the first subcostal nervule is slightly bowed upwards soon after its origin towards the costal nervure, from which however it is well separated ; the origin of the second subcostal is rather nearer to the base of the first than it is to the base of the upper discoidal ; there is of course no upper disco-cellular nervule, the middle disco-cellular originates from the upper discoidal soon after the origin of the latter, and is slightly outwardly oblique ; the lower disco-cellular as long as the middle disco-cellular, and slightly inwardly oblique ; the second median nervule has its origin a little before the lower end of the cell. In the hindwing the first subcostal nervule originates some distance before the apex of the cell ; the disco-cellular nervules are of about equal length, outwardly oblique (the lower slightly less outwardly oblique than the upper, the two veins therefore not quite in a straight line), the upper sinuous, the lower straight ; the second median nervule originating just before the lower end of the cell ; submedian nervure straight, internal nervure with its base straight and lying close to the base of the submedian nervure, then suddenly strongly bowed outwards, rather short. The tails are short and filiform, the middle tail at the termination of the first median nervule longer than the one on either side of it ; the anal lobe is small. Eyes naked. Palpi much longer in the female than in the male.

The genus *Rathinda* contains but a single species, which is brown on the upperside, with an oblique transverse discal macular white or ochreous band on the forewing, and a submarginal reddish-ochreous band on the hindwing. The underside is very beautifully marked, the apex of the forewing is ochreous-brown, the base of the forewing and the entire hindwing is sometimes pure white, sometimes pale ochreous-brown or greyish-ochreous, sometimes entirely ochreous, marked with dark ochreous-brown lines, patches and spots ; the hindwing with a submarginal metallic silvery-green line. The middle tail is about twice as long as the one on either side of it. The male has no secondary sexual characters. Its distribution is confined to eastern and southern India and Ceylon. Its full-grown larva is most aberrant, and were the characters exhibited by the skins of full-grown larvæ of much if any value in showing the alliances of genera they would in this case seem to link *Rathinda* to *Spalgis*, Moore, which also has the larva furnished with tubercles ; these appear in that genus to be even longer than in *Rathinda*.

959. **Rathinda amor**, Fabricius. (PLATE XXIX, FIG. 227 ♀).

Papilio amor, Fabricius, Syst. Ent., p. 518, n. 321 (1775); idem, id., Sp. Ins., vol. ii, p. 113, n. 491 (1781); idem, id., Mant. Ins., vol. ii, p. 65, n. 610 (1787); id., Herbst, Pap., vol. xi, p. 43, n. 89, pl. cccii, figs. 9, 10 (1804); *Hesperia amor*, Fabricius, Ent. Syst., vol. iii, pt. 1, p. 260, n. 7 (1793); *Polyommatus amor*, Godart, Enc. Méth., vol. ix, p. 620, n. 8 (1823); *Zephyrius amor*, Guérin-Méneville, Icon. Règne Anim., Ins., p. 490, pl. lxxxi, fig. 6 (1844); *Myrina amor*, Butler, Cat. Fab. Lep. B. M., p. 184, n. 6 (1869); *Rathinda amor*, Moore, Lep. Cey., vol. i, p. 99, pl. xlii, figs. 1, 1*a* (1881); *Sithon amor*, Staudinger, Ex. Schmett., p. 277, pl. xcv, *female* (1888); *Papilio triopas*, Cramer, Pap. Ex., vol. iv, pl. cccxx, figs. G, H (1780); *Myrina triopas*, Horsfield and Moore, Cat. Lep. Mus. E. I. C., vol. i, p. 49, n. 81, pl. xii, fig. 7, *larva*; 7*a*, *pupa* (1857); id., Moore, Proc. Zool. Soc. Lond., 1865, p. 776.

HABITAT: Calcutta (*Moore*), Upper Assam, Orissa, South India, Ceylon.

EXPANSE: ♂, ♀, ·95 to 1·30 inches.

DESCRIPTION: MALE and FEMALE: "UPPERSIDE, *both wings* violet-brown. *Forewing* with an ochreous-white spot beyond the end of the cell, and two less distinct smaller spots obliquely below it [divided by the second median nervule]. *Hindwing* with a marginal row of red lunules from the anal angle, outwardly bordered by a slender white line [and enclosing lunular black spots]. UNDERSIDE, *both wings* pale ochreous-brown or greyish-ochreous. *Forewing*, basal area with ochreous or white-bordered black spots; a curved white oblique black-bordered discal band, and a slender marginal line; a short waved streak on lower end of discal band. *Hindwing*, basal area with ochreous or white-bordered black spots, a curved medial sinuous black line, a more even discal line, and a submarginal line, the latter white within, and bordered by metallic-green lunules; the subanal spaces also black-speckled. *Palpi* brown above, white beneath. *Legs* white with black bands." (*Moore*, l. c. in Lep. Cey.)

LARVA, cylindrical, green, marked on the medial segments in the dorsal region with reddish, furnished with numerous curved fleshy tubercles of varying length. The food-plant is unknown. PUPA, green marked with violet, of the usual lycænid form.

There is very considerable variation in the markings of the underside of the imago; in one Bombay specimen possessed by me the white ground-colour is entirely replaced by yellow, and in all specimens there is a yellow band on the hindwing within the metallic-green band, this band often more or less diffused inwardly and spreading on to the basal area of the forewing, obliterating the white ground. There is usually a prominent black spot on the margin of the hindwing in the first median interspace. In the Indian Museum, Calcutta, is a single specimen from Sibsagar in Upper Assam, obtained by Mr. S. E. Peal; Mr. Moore has recorded it from Calcutta, but I have never met with it in that locality; in Orissa Mr. W. C. Taylor has taken it in February, March and July; Mr. E. A. Minchin has taken it in Ganjam, and at Bangalore in August; at Karinja, Bombay, it occurs in September and October; Mr. E. H. Aitken states that "*R. amor* occurs almost everywhere in Bombay, but is common nowhere. It appears at the close of the rainy season. It is fond of taking its stand on the point of a prominent leaf, with wings closed and an air of decision not easy to describe. *Aphnæus* has the same habit." Mr. Moore records it also from Canara; in the Nilgiris Mr. G. F. Hampson reports it as being "rare on the lower slopes, 2,000 to 4,000 feet," and in Ceylon it is found in the "Eastern and Western Provinces, in low country forests during the S.-W. monsoon—May to September. Flies about amongst the trees and settles on the leaves. Easily captured" (*Hutchison*). "Kandy; Galle. Common" (*Wade*).

The figure shews both sides of a female example from Orissa in my collection.

Genus 159.—HORAGA, Moore. (PLATE XXV).

Horaga, Moore, Lep. Cey., vol. i, p. 98 (1881); id., Distant, Rhop. Malay., p. 459 (1886).

"FOREWING, short, triangular; *costa* gently arched, *apex* acute, *exterior margin* slightly oblique, even; *costal nervure* recurved; *first subcostal nervule* emitted at half length of the cell, *second* at one-third, and *third* close to the end, *fourth* from its end; *discoidal cell* recurved, broad; *disco-cellular nervules* nearly erect; radial [*lower discoidal*] nervule from their middle;

second median nervule from near the end of the cell ; *first* median at one-third before the end ; *submedian nervure* straight. HINDWING, short, broad, bluntly oval ; *exterior margin* uneven, furnished with three slender *tails*, [the middle the longest] ; *costal nervure* much curved its entire length ; *first subcostal nervule* at one-third before the end of the cell ; *disco-cellular* nervules oblique, *discoidal* nervule from their middle ; *third* and *second median* nervules from the end of the cell, *first* median at one-third before the end ; *submedian nervure* slightly curved, *internal* nervure recurved. BODY, short ; *thorax* stout ; *palpi* porrect, second joint squamose, slender, extending half beyond the head, third joint cylindrical, one-third the length of the second ; *legs* short ; *antennæ* short, gradually thickening to a pointed club. Type, *Horaga onyx*, Moore." (*Moore*, l. c.)

"The males of the genus *Horaga* [except *H. viola*, Moore, and *H. albimacula*, Wood-Mason and de Nicéville] may at once be distinguished from the females by an oval ochreous glandular patch of closely-packed scales on the underside of the forewing placed on and near the middle of the submedian nervure." (*de Nicéville*, Journ. A. S. B., vol. lii, pt. 2, p. 97 (1883).

In neuration *Horaga* comes very close to *Rathinda*, Moore. In the forewing the costal nervure and subcostal nervules in *Horaga* lie much closer together than in *Rathinda* ; the costal nervure ends opposite to the apex of the discoidal cell ; the first subcostal nervule is slightly bowed upwards towards the costal nervure soon after its origin ; the base of the second subcostal is considerably nearer to the base of the first than it is to the base of the upper discoidal ; the middle disco-cellular is much shorter than the lower, both are only very slightly concave and upright, and thus more in one straight line than in *Rathinda* ; the second median nervule is given off some little distance before the lower end of the discoidal cell. In the males of those species which have a glandular patch of scales on the submedian nervure, the inner margin of the wing is bowed outwards opposite this patch. In the hindwing the costal nervure is much shorter than in *Rathinda*, not nearly reaching the apex of the wing ; the disco-cellular nervules are strongly outwardly oblique and in one straight line, and are slightly concave ; the second and third median nervules have a common origin at the lower end of the cell, the internal nervure is staighter than in *Rathinda*. The eyes are naked. The palpi are longer in the females than in the males. The antennæ are considerably less than half as long as the costa of the forewing.

Like *Catapœcilma*, Butler, *Rathinda* and *Drupadia*, Moore, and *Eooxylides*, mihi, this genus is furnished with three tails to the hindwing in both sexes, and has only two subcostal nervules to the forewing. The outline of *Horaga* is somewhat variable, as *H. albimacula*, Wood-Mason and de Nicéville, and *H. viola*, Moore, have the outer margin of the forewing in both sexes much convexed, this feature being usually seen in the female only. I do not quite know what Mr. Moore means by calling the discoidal cell of the forewing "recurved." The outer tail at the end of the second median nervule is the shortest, the inner one at the apex of the submedian nervure is about twice as long, and the middle one at the termination of the first median nervule the longest of all, twice as long as the innermost one. About ten species of the genus have, as far as I can ascertain, been described, all of which, except the "*Myrina*" *mænala* of Hewitson from Borneo, which may belong to a different genus, have in both sexes a prominent pure white patch in the middle of the forewing on the upperside, which patch on the underside is usually larger, and crosses the hindwing in the form of a medial fascia. All the species are more or less blue or purple on the upperside, except *H. viola*, Moore, which is violet-brown in both sexes. The genus is a purely Oriental one, its head-quarters being in India, where it occurs in the Himalayas and Assam, Orissa, South India, Ceylon, and Burma, it is found also in the Malay Peninsula and the Andaman Isles, also in some of the Islands of the Malay Archipelago. Many of the species are very closely allied, and are consequently very difficult to discriminate, and where more than one species occurs in the same locality, it is by no means easy to pair the sexes correctly. Their flight is rapid, but they do not fly far, quickly settling again, usually on a leaf of a bush or tree.

Key to the Indian species of Horaga.

A. Males with an oval ochreous patch of closely-packed scales differently-formed from those on the rest of the wing on the underside of the forewing near the middle of the submedian nervure.

a. Discal white patch on underside of forewing extending above subcostal nervure.

*a*¹. Male, upperside, forewing with discal white patch large, not crossed by black veins, blue coloration extending into cell.

*a*². Underside, discal white band broad in hindwing.

960. H. ONYX, Himalayas, Assam, Orissa, South India.

*b*². Underside, discal white band narrow in hindwing.

961. H. CINGALENSIS, Ceylon.

*b*¹. Male, upperside, forewing with discal white patch small, crossed by black veins, blue coloration not extending into cell.

962. H. RANA, South Andaman Isles.

b Discal white patch on underside of forewing not extending above subcostal nervure.

*a*¹. Underside, forewing, discal band very narrow.

963. H. MOULMEINA, Burma.

b ¹. Underside, forewing, discal band broad.

964. H. SIKKIMA, Sikkim, Bhutan, Khasi Hills.

B. Males with no secondary sexual characters.

a. Male, upperside, both wings violet-brown.

965. H. VIOLA, Himalayas, Nilgiris.

b. Male, upperside, forewing black, hindwing dark violet-blue, outwardly bordered with black.

966. H. ALBIMACULA, South Andaman Isles.

960. Horaga onyx, Moore.

Thecla onyx, Moore, Horsfield and Moore, Cat. Lep. Mus. E. I. C., vol. i, p. 30, n. 35 (1857) ; *Horaga onyx*, Moore, Proc. Zool. Soc. Lond., 1882, p. 247.

HABITAT: Himalaya (*Moore*), Deyra Doon, Dharmsala, Sikkim, Assam, Orissa, South India.

EXPANSE: ♂, ♀, 1·15 to 1·35 inches.

DESCRIPTION: MALE. "UPPERSIDE, *forewing* dark brown with a patch of white in the middle, the posterior base, from the subcostal nervure to the middle of the disc, cyaneous. *Hindwing* light brown, the middle, from base to near exterior margin, cyaneous, paling to light bluish-brown along the abdominal margin. *Tails* three, two inner ones longish. UNDERSIDE, *both wings* pale ferruginous-brown, a white fascia crossing both wings towards the anal angle, and ending on the *hindwing* upwards to abdominal margin in a greenish-metallic line, the latter being bounded inwardly by a narrow blackish line ; a blackish spot and line at the anal angle, and another spot some distance off on the exterior margin." (*Moore*, l. c. in Cat. Lep. Mus. E. I. C.)

"MALE. UPPERSIDE, *both wings* violet-brown. *Forewing* with the lower basal and discal areas cyaneous-blue, discal white spot large, the same size as in the female of *H. viola*, Moore. *Hindwing* paler, the medial area cyaneous-blue. UNDERSIDE, *both wings* pale olivaceous brownish-ochreous, the discal band on the *forewing* attenuated anteriorly and extending to the costal border, the band on the *hindwing* very broad and irregular ; anal and subanal spots small. FEMALE. UPPERSIDE, *both wings* paler. *Forewing* with the discal spot very large and oval, band on UNDERSIDE as in male."

"Taken by Mr. Hocking on quince tree, at 6,000 feet elevation."

"The type specimen described above is now in the British Museum collection. Its locality label is 'Himalaya,' not Burmah, as stated in my original description." (*Moore*, l. c. in Proc. Zool. Soc. Lond.)

A very common species in Sikkim, and occurring in April, July, October and November. The specimens which are on the wing in the cold weather have all the markings below more blurred and larger and the ground-colour paler than rains' examples. I possess specimens also from Kulu taken by Mr. A. Grahame Young ; from Deyra Doon, taken in August by Mr. P. W. Mackinnon ; Colonel A. M. Lang, R.E., took a single specimen on 10th September, 1887, at Khairna, Kosi Valley, 3,200 feet, Kumaon, and another in December on the Choka river, in

the sâl forests of the Pilibhit Terai; Mr. J. L. Sherwill has sent me a male taken in July at Jorehât, Assam; Mr. W. C. Taylor has taken it in Orissa in March; Mr. G. F. Hampson has sent it to me from the Nilgiris, and writes regarding it: "A rare species, occurring on the lower slopes;" and there is a single female in the Indian Museum, Calcutta, from Cannanore, South India.

961. **Horaga cingalensis**, Moore.

H. cingalensis, Moore, Proc. Zool. Soc. Lond., 1883, p. 525; *H. ciniata*, Moore (*nec* Hewitson), Lep. Cey., vol. i, p. 99, pl. xxxix, figs. 2, 2*a*, *male* (1881).

HABITAT: Ceylon.

EXPANSE: ♂, 1·10; ♀, 1·25 inches.

DESCRIPTION: "MALE. UPPERSIDE, *both wings* very like *H. onyx*, Moore; the blue basal areas of similar tint. *Forewing* with the discal white spot smaller. UNDERSIDE, *both wings* very dark violaceous brownish-ochreous. *Forewing* with the discal band narrower but extending to the costa. *Hindwing* with the band also narrower and much more regular, anal spots much less prominent."

"A much smaller species than and quite distinct from *H. ciniata*, Hewitson, which latter is confined to the Malay Island of Batchian." (*Moore*, l. c. in Proc. Zool. Soc. Lond.)

In Mr. Moore's figure of this species in the "Lepidoptera of Ceylon" the discal white band on the underside of the hindwing appears to be narrow, of nearly equal width throughout, with its inner edge very straight and even. In *H. onyx*, Moore, the band is usually broader, with its inner edge irregular, but neither of these features are constant, and I can find no character by which to separate the two species; however I know *H. cingalensis* by Mr. Moore's figures and descriptions only. I append Mr. Moore's earlier description of the species.* In Ceylon it is recorded from "Kandy. Rare. Easy to capture. Rests on low bushes. Is by no means shy, and when disturbed does not fly far" (*Wade*).

962. **Horaga rana**, de N. (PLATE XXV, FIG. 149 ♂).

H. rana, de Nicéville, Journ. A. S. B., vol. lvii, pt. 2, p. 283, n. 13, pl. xiv, fig. 10, *male* (1888).

HABITAT: South Andaman Isles.

EXPANSE: ♂, 1·15 to 1·25; ♀, 1·20 to 1·35 inches.

DESCRIPTION: "MALE. UPPERSIDE, *both wings* differ from *H. albimacula*, Wood-Mason and de Nicéville, in the violet-blue coloration being replaced by pure cærulean blue. *Forewing* in having the oval discal white patch smaller, bounded by the lower discoidal and first median nervules, in one specimen only extending very slightly into the submedian interspace, divided into three portions by the black crossing nervules; in one specimen there is a considerable patch of pure cærulean blue scales on the basal half of the wing below the median nervure, this patch is obsolete in another specimen and entirely absent in a third. UNDERSIDE, *forewing* differs in having the median white band extending conspicuously almost to the costa and pure white throughout, its anterior portion not washed with fuscous as in *H. albimacula*. *Hindwing* with the median white fascia averaging twice as broad; this, however, is a variable feature in both species. FEMALE, much larger than the male in three out of four specimens. UPPERSIDE, *forewing* with the discal white patch twice as large, extending from the subcostal almost to the submedian nervure, and proportionally broad; a few pale grey-blue scales placed below the median nervure towards the base in two specimens. *Hindwing* with some scattered pale grey-blue scales on the disc. UNDERSIDE, *both wings* bright fulvous. *Forewing* with the discal white patch almost touching the costa, its

* "MALE and FEMALE. UPPERSIDE, *both wings* violet-black; lower basal and discal areas blue. *Forewing* with a large oval white medial discal spot. *Hindwing* with a slender white marginal line. UNDERSIDE, *both wings* pale brownish-ochreous, crossed by a white band, the band bulged outwards on the disc of the *forewing*. *Hindwing* with a slender white marginal line, a series of black spots from the anal angle, the penultimate spot nearly obliterated by grey scales; a lunular band of metallic-green scales above each spot, and two streaks above the anal angle. *Palpi* black, grey-speckled at the sides. *Legs* white, with black bands." (*Moore*, l. c. in Lep. Cey.)

anterior portion narrow and outwardly slightly hooked; the ground-colour beyond the white patch increasingly to the costa fuscous; inner angle and margin pale. *Hindwing* with the outwardly-diffused discal band outwardly bordered by a pale fuscous fascia, widest at the costa and obsolete at the third median nervule. Otherwise as in *H. albimacula*."

"Described from two males and three females collected by the late Mr. A. R. de Roepstorff, and now in the Indian Museum, Calcutta, and another pair taken by Mr. R. Wimberley in my own collection." (*de Nicéville*, l. c.)

The figure shews both sides of the type male specimen from the South Andaman Isles in my collection.

963. **Horaga moulmeina**, Moore.

H. moulmeina, Moore, Proc. Zool. Soc. Lond., 1883, p. 525; *Myrina syrinx*, Hewitson (*nec* Felder), Ill. Diurn. Lep., *Lycænidæ*, pp. 34, 40, n. 24, pl. xiv, figs. 32, 33, *male* (1863).

HABITAT: Moulmein.

EXPANSE: 1·1 to 1·3 inches.

DESCRIPTION: "Allied to *H. onyx*, Moore. MALE. UPPERSIDE, *forewing* differs in having a smaller and more trilobate-formed white discal spot. UNDERSIDE, *both wings* of a much brighter ochreous colour. *Forewing* with the discal band only half the width of that in *H. onyx*, and does not extend above the subcostal nervure. *Hindwing* with the band narrower, regular, and of uniform width, anal and two subanal spots large. FEMALE. UPPERSIDE, *both wings* paler. UNDERSIDE, *both wings* also of the same brighter colour, and the band similar to that of the male."

"The *H. syrinx* of Felder is an Amboina species." (*Moore*, l. c.)

I have never seen this species, and from Mr. Hewitson's figure of it can discover no character by which to separate it from *H. sikkima*, Moore, except that the discal band on the underside of the forewing is a little narrower, and of the hindwing somewhat broader.

964. **Horaga sikkima**, Moore.

H. sikkima, Moore, Proc. Zool. Soc. Lond., 1883, p. 525; *Horaga* species, de Nicéville, Journ. A. S. B., vol. lii, pt. 2, p. 96, n. 235 (1883).

HABITAT: Sikkim, Bhutan, Khasi Hills.

EXPANSE: 1·2 to 1·4 inches.

DESCRIPTION: "MALE. UPPERSIDE, *both wings* differ from *H. onyx*, Moore, in the lower basal and discal areas being of a darker blue tint. *Forewing* with the discal white spot intermediate in size. UNDERSIDE, *both wings* of a slightly brighter ochreous tint than in *H. syrinx*, [as figured by] Hewitson, [= *H. moulmeina*, Moore]. *Forewing* with the discal band somewhat broader. *Hindwing* with the band very much narrower, being about the same width as in *H. viola*, Moore." (*Moore*, l. c.) FEMALE. UPPERSIDE, *both wings* differ from the male in the blue areas being duller and of a more purple shade. *Forewing* with the discal white patch larger. UNDERSIDE, *both wings* bright ochreous as in the male, the white discal band rather wider.

Mr. Otto Möller possesses three males and five females of this species, two of which were taken in July and August, and one in October, and I possess seven males and one female, also from Sikkim, as well as a male from the Khasi Hills, the latter taken by the Rev. Walter A. Hamilton. In the Indian Museum, Calcutta, is a single male from Bhutan. It agrees with *H. viola*, Moore, and differs from *H. onyx*, Moore, in the discal white patch on the underside of the forewing not reaching the costa; its bright ochreous coloration below is also very distinctive. I described this species independently, but gave it no name,* as I considered

* "MALE. UPPERSIDE, *both wings* black. *Forewing* with the discal white spot small and distinctly indented at the nervules, outwardly thrice, inwardly twice; below the median nervure basally cyaneous-blue. *Hindwing* paler, the disc blue; a fine marginal pale blue line not reaching the apex. UNDERSIDE, *both wings* bright ochreous. *Forewing* with the discal spot divided posteriorly by a brownish line, the spot not quite reaching the subcostal nervure. *Hindwing* with the discal band somewhat narrow, white, inwardly nearly straight and sharply defined with a dark brown line; the black spot on the anal lobe large; a large quadrate patch

it then to be too near the species figured by Mr. Hewitson under the name of *Myrina onyx* (*M. syrinx* on the plate) to be given distinct specific rank, but I find that *H. sikkima* differs from that figure in always having the discal band on the hindwing on the underside narrower, but it is rather variable in width, and specimens may hereafter be found linking *H. sikkima* to *H. moulmeina*.

Horaga halba, Distant, has been described as below* from the Malay Peninsula. The sex of the specimen described is not stated, but to judge from the outline of the wings it is almost certainly a female, nor to what species it is nearest allied, but from the figure it appears to be nearest on the upperside to *H. albimacula*, Wood-Mason and de Nicéville; the coloration is violet-blue, while in all the other species of the genus it is blue. *H. halba* on the underside is near to *H. sikkima*, Moore, and *H. moulmeina*, Moore, the colour of the ground is the same, and the discal white patch on the forewing does not nearly reach the costa.

965. **Horaga viola**, Moore.

H. viola, Moore, Proc. Zool. Soc. Lond., 1882, p. 248.

HABITAT: Dharmsala, N.-W. Himalayas; Sikkim; Nilgiris.

EXPANSE: ♂, ·9; ♀, 1·0 inch.

DESCRIPTION: "MALE. UPPERSIDE, *both wings* violet-brown. *Forewing* with a small white discal spot. UNDERSIDE, *both wings* darkish violaceous brownish-ochreous, the white discal spot continued to the posterior margin. *Hindwing* with the band narrowly white in both sexes. FEMALE. UPPERSIDE, *both wings* violet-brown, palest on the hindwing; lower basal and discal areas dull cyaneous-blue. *Forewing* with the discal spot larger than in the male." UNDERSIDE, *both wings* as in the male. (*Moore*, l. c.)

"A rare species occurring on the lower slopes of the Nilgiris, 2,000 to 4,000 feet" (*G. F. Hampson*). Rare also in Sikkim, Mr. Otto Möller possesses eight males and two females. The male of this species does not possess the "male mark" on the underside of the forewing, which is present in all the other species of the genus known to me, except *H. albimacula*, Wood-Mason and de Nicéville. I think Mr. Moore has described the female of this species incorrectly. The sexes are alike in coloration, at least in Sikkim; specimens from thence in my collection have been identified by Mr. Moore as *H. viola*. It is the smallest known species of the genus, my specimens measuring exactly an inch in expanse. Male specimens from the Nilgiris have the white discal patch on the upperside of the forewing outwardly sullied with ochreous.

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of irrorated black and white scales beyond, then another large black spot in the first median interspace, with a smaller linear one in the interspace beyond, all anteriorly defined with a pale metallic greenish line, also a line of the same colour in continuation of the discal white band, recurved to the abdominal margin. FEMALE larger, wings broader, apex of *forewing* more rounded, discal spot larger. *Hindwing* with the blue colour paler and more restricted; four irrorated bluish spots between the nervules at the anal angle within the marginal pale blue line. UNDERSIDE, *both wings* as in the male."

"The species described above may be known from Sikkim specimens of *H. ciniata*, Moore, [=*H. onyx*, Moore], by the ground-colour of the underside being bright ochreous, and the discal spot not nearly reaching the costa; in this respect it agrees with Sikkim specimens of *H. viola*, Moore, but is otherwise abundantly distinct from that species. It is well figured by Hewitson (Ill. Diurn. Lep., *Lycænidæ*, pl. xiv, figs. 32, 33, 1863) under the name of *Myrina onyx* (*Myrina syrinx* on the plate; the specimen figured being probably a male by reason of the pointed apex to the forewing). The *Myrina syrinx*, Felder, *female*, (Sitzh. Ak. Wiss. Wien, Math.-Nat. Cl., vol. xl, p. 452, n. 14, 1860) from Amboyna is probably a distinct species." (*de Nicéville*, l. c.)

* *Horaga halba*, Distant, Rhop. Malay., p. 460, n. 1, pl. xliv, fig. 23 (1886). HABITAT: Penang. EXPANSE: 1·1 inches. DESCRIPTION: "UPPERSIDE, *both wings* violaceous-blue. *Forewing* with the costal, apical and outer areas fuscous (the last two very broadly so), and containing a discal whitish spot situated at about the end of the cell. *Hindwing* with the costal and outer areas fuscous, a submarginal greyish-white line, and the tails with their apices greyish. UNDERSIDE, *both wings* pale ochraceous, crossed by a discal greyish-white fascia, broadest on the forewing, where it commences at a little beyond the end of the cell, and narrowing on the hindwing below the median nervure, where it is recurved and continued upwards to the abdominal margin as a metallic-greenish fascia inwardly margined with blackish, and followed beneath by a similar fascia. *Hindwing* with a series of marginal blackish spots near the anal angle, inwardly margined with metallic-greenish and black; one at the anal angle greyish dusted with black; posterior margin with two blackish lines bordered on each side with greyish. *Body* mutilated."

"*H. halba* belongs to a group of species in which great similarity of colour and markings is found. I have, however, carefully compared it with the other described species of the genus, and in the shape of the white spot above, and the width and pattern of the white fascia beneath find sufficient characters to separate it." (*Distant*, l. c.)

966. **Horaga albimacula,** W.-M. & de N. (PLATE XXV, FIG. 148 ♂).

'*Sithon*' *albimacula*, Wood-Mason and de Nicéville, Journ. A. S. B., vol. l, pt. 2, p. 249, n. 68 (1881); *Horaga albimacula*, de Nicéville, l. c., vol. lvii, pt. 2, p. 284, pl. xiv, fig. 9, *male* (1888).

HABITAT : South Andaman Isles.

EXPANSE : ♂, 1·09 to 1·20 inches.

DESCRIPTION : " MALE. UPPERSIDE, *forewing* brown-black of a vinous tint, with a large conspicuous oval white discal spot equal in length to half the breadth of the part of the organ on which it lies, equally distant from the opposite margins, and so placed that its major axis and more pointed anterior end are directed towards the middle of the costa. *Hindwing* dark violet-blue, bordered increasingly from the base of the anterior margin to the apical angle and thence decreasingly to the anal angle with fuscous-black, and from the submedian nervure to the abdominal margin with greyish-black ; with a fine black anteciliary line and, immediately internal to this, a very faint and fine silver-grey line decreasing from the anal angle and dwindling to nothing before reaching the apical angle ; with the *cilia* dark brown, evenly tipped with silvery-white ; and with the *tails* black-brown, the unequal submedian and second median shorter ones edged internally with silvery-white cilia, and the longer intermediate first median one white-tufted at its inner extremity. UNDERSIDE, *both wings* much lighter. *Forewing* with a broad and prominent white band bordered both sides with fuscous of a darker shade than the rest of the ground-colour, passing off from the greyish-white basal portion of the inner margin across the organ to within a short distance of the costa, increasing in its course to a little beyond the first median nervule, and thence decreasing to its anterior extremity (which is washed with fuscous), so that its outline, while almost straight internally, is bluntly obtuse-angled externally ; and with the outer margin at the inner angle obsoletely trilineated with white as in the hindwing. *Hindwing* with a narrower and less conspicuous discal whitish band of uniform width throughout, not sharply defined, but on the contrary diffused externally, and bordered internally with a line of fuscous which is darker than the ground, sharply bent inwards at right angles to itself to the abdominal margin, and externally margined with brassy at its posterior end ; with the deep black spot of the small anal lobe, a large patch of grey scales between the ends of the submedian nervure and the first median nervule, an intense black spot next to and about half the size of this between the ends of the first and second median nervules, and a very short and transversely elongated or narrow similar but inconspicuous black spot between the ends of the first and second median nervules, all internally margined with a discontinuous line of brassy scales which extends from the point where the dark discal striga with its brassy edging reaches the abdominal margin all along the outer margin of the organs, following the inner contours of the above-described spots, up to the second subcostal nervule ; and with the external margin finely lineated with three regularly concentric silvery-white lines separated from one another by the black anteciliary line and the brown bases of the cilia." (*Wood-Mason* and *de Nicéville*, l. c.)

In the Indian Museum, Calcutta, are two males of this species collected by the late Mr. A. R. de Roepstorff, and in my own collection are five more males obtained by Mr. R. Wimberley, all from the Andaman Isles. This species shares with *H. viola*, Moore, the peculiarity of having no " male-mark." The female has yet to be discovered.

The figure shows both sides of the male type specimen from the South Andaman Isles in the collection of the Indian Museum, Calcutta. It gives a very poor representation of the species, and hardly shews the large well-defined violet discal patch of the hindwing.

Genus 160.—CATAPŒCILMA, Butler. (PLATE XXIX).

Catapœcilma, Butler, Trans. Linn. Soc. Lond., Zoology, second series, vol. i, p. 547 (1877) ; id., Moore, Lep. Cey., vol. i, p. 97 (1881) ; id., Distant, Rhop. Malay., p. 234 (1884).

" Allied to *Lampides*, Hübner, and *Miletus*, Hübner, but differs from both in having three tails to the hindwing ; the antennæ are long, slender and acuminate ; the wing-cells and

neuration generally are very like that of *Lampides*; the wings below are spangled with silver, much as in *Miletus* (*Hypochrysops*, part, Felder)." (*Butler*, l. c.)

"FOREWING, subtriangular; *costal margin* only slightly convex, *apex* obtusely rounded, *outer margin* moderately convex and scalloped, *inner* margin slightly concavely sinuate; *costal nervure* short, terminating on the costa nearly opposite the end of the cell; *first subcostal nervule* emitted near the middle of the cell, *second* about midway between the bases of the first and third, *third* emitted close to the end of the cell and continued to the apex; *second median* nervule emitted about one-fifth before the end of the cell, *first* median a little beyond the middle. HINDWING, irregularly subovate; *costal margin* convex at the base and then nearly straight to the apex, which is rounded, *posterior* margin very slightly scalloped, with three slender *tails* situated respectively at the apices of the second and first median nervules and of the submedian nervure; *costal nervure* extending to about the apex of the wing; *subcostal nervules* bifurcating about one-third before the end of the cell, *third* and *second median* nervules emitted close together near the end of the cell. *Palpi* moderately long, much compressed, second joint projecting more than half beyond the head and longly hirsute beneath; apical joint slender, but well-formed. *Antennæ* with a gradually-formed but well-developed apical club." *Eyes* hairy. (*Distant*, l. c.)

The neuration of *Catapœcilma* agrees very closely with that of *Horaga*, Moore, but the male never has secondary sexual characters as are found in most of the species of the latter genus. In the forewing the middle disco-cellular nervule is upright, shorter than the lower, the latter slightly concave and slightly inwardly oblique. In the hindwing the upper disco-cellular nervule is slightly concave and a little outwardly oblique, the lower the same length as the upper, straight and upright; the second and third median nervules have a common origin at the lower end of the discoidal cell; the internal nervure is very short, shorter even than in *Rathinda*, Moore. The tails are exactly as in *Rathinda* and *Horaga*.

Two species only are certainly known up to the present time; one, *C. elegans*, Druce, has a wide range in India, occurring also in Ceylon, Burma, the Malay Peninsula, Nias Island, and Borneo; the other, *C. delicatum*, de Nicéville, has hitherto been found in Sikkim only. A third species has been recorded from Malacca, but, as it is described and figured as having two tails only, it may belong to another genus. The two Indian species possess three very slender tails to the hindwing, the middle one about twice as long as the others. All the species are very beautifully marked with silvery-green or metallic-violet bands and spots on the underside of both wings.

Key to the Indian species of Catapœcilma.

A. Male, upperside dark violet-blue; underside, both sexes with rufous bands marked with glittering and metallic violet colour.

967. C. ELEGANS, India, Ceylon, Burma, Malay Peninsula, Nias Island, Borneo.

B. Male, upperside smoky purplish-black; underside, both sexes striated throughout with chrome-yellow and black, and with scattered silvery-green spots.

968. C. DELICATUM, Sikkim.

967. Catapœcilma elegans, Druce. (PLATE XXIX, FIG. 228 ♀).

Hypochrysops elegans, Druce, Proc. Zool. Soc. Lond., 1873, p. 350, n. 1, pl. xxxii, fig. 12, *female*; *Catapæcilma elegans*, Butler, Trans. Linn. Soc. Lond., Zoology, second series, vol. i, p. 548, n. 1 (1877); id., Moore, Lep. Cey., vol. i, p. 98, pl. xxxix, figs. 3, 3*a*, *male* (1881); id., Distant, Rhop. Malay., p. 235, n. 1, pl. xxii, fig. 17, *male* (1884); id., Staudinger, Ex. Schmett., p. 282, pl. xcvi, *female* (*nec* male) (1888); *Catapæcilma elegans*, Wood-Mason and de Nicéville, Journ. A. S. B., vol. lv, pt. 2, p. 368, n. 129, pl. xv, fig. 6, *male* (1886).

HABITAT: Masuri, Sikkim, Orissa, South India, Ceylon, Assam, Burma, Malay Peninsula, Nias Island, Borneo.

EXPANSE: ♂, 1·1 to 1·4; ♀, 1·0 to 1·4 inches.

DESCRIPTION: "MALE. UPPERSIDE, *both wings* dark violet-blue, with the costal and outer margins somewhat narrowly dark fuscous. *Hindwing* with an inner greyish marginal

line from beneath the subcostal nervules, and with three transverse greyish submarginal streaks near the anal angle divided by the median nervules. *Tails* fuscous, with their apices greyish-white. *Cilia* of both wings greyish. UNDERSIDE, *both wings* greyish-brown. *Forewing* with three rufous spots margined with black and silvery crossing the cell; a series of silvery spots in the subcostal area, two beyond the cell divided by the lower discoidal nervule, two or three beneath the cell (both of these followed by ochraceous and black), an outer and irregular discal series of five spots crossing the wing, and a submarginal series in which the silvery hue is somewhat less intense; between the discal and submarginal series of spots are some dark fuscous markings. *Hindwing* with the following rufous spots, margined with black and silvery:—two beneath the costal nervure, one (round) about the middle of the cell, and one (transverse) at the end of the cell; two beneath the cell and situated between the submedian nervure and the first median nervule, and one (transverse) about the middle of the abdominal margin; on about the basal third of the costal margin are some rufous, black, and silvery markings; two discal series of silvery spots margined with black across the wing, between and beyond which are some black spots on a rufous ground-colour, a submarginal series of pale silvery spots placed between the nervules, that between the second and first median nervules replaced by a black spot margined with rufous, and the silvery spots at the anal angle margined with black; *tails* pale fuscous with their apices greyish-white. *Cilia* of both wings silvery grey. *Body* above and beneath more or less concolorous with the wings. FEMALE. UPPERSIDE, *both wings* pale violet-blue, with the costal and outer margins broadly dark fuscous. *Hindwing* with three pale transverse spots near the anal angle, divided by the second and first median nervules, and the inner margin also narrowly silvery at this area. UNDERSIDE, *both wings* with the ground-colour much paler than in the male, but with the markings similar." (*Distant*, l. c.)

This species was first described as below* from Borneo. It occurs also at Penang, Perak, Malacca, Johore and Sungei Ujong in the Malay Peninsula. Mr. Wood-Mason obtained it in Cachar in May and June; it occurs commonly in Sikkim in March, April and October, the males much more often seen than the females; Mr. P. W. Mackinnon has sent me a single female taken at Masuri, 3,000 feet, in April; Mr. W. C. Taylor has obtained it in Orissa; Mr. E. H Aitken records it from Bassein, Tanna District, Bombay, in March and April; Mr. G. F. Hampson has found it fairly common on the lower slopes of the Nilgiris from 2,000 to 4,000 feet; there is a single specimen from Cannanore in South India in the Indian Museum, Calcutta; Mr. A. W. Morris reports that *C. elegans* occurs commonly in the Shevaroy Hills in May and August, and may be taken on the leaves of the orange trees during the heat of the day, and that it has a curious habit of returning to the same twig from which it has been disturbed; it occurs at Kandy in Ceylon, "common" (*Wade*); and Mr. W. Doherty obtained it at Mergui and Myitta in Upper Tenasserim.

The figure shews both sides of a female example in my collection from the Shevaroy Hills in South India.

968. **Catapœcilma delicatum**, de N.

C. delicatum, de Nicéville, Proc. Zool. Soc. Lond., 1887, p. 455; *Catapœcilma bubases*, de Nicéville (*nec* Hewitson), Journ. A. S. B., vol. liv, pt. 2, p. 118, pl. ii, figs. 11, *male*; 1, *female* (1885).

HABITAT: Sikkim.

EXPANSE: ♂, ♀, 1·25 inches.

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* FEMALE. "UPPERSIDE, *both wings* greyish-blue. *Forewing* with the costal margin dark brown. UNDERSIDE, *both wings* pale brown. *Forewing* crossed beyond the cell by a rufous band, with a row of small black spots in the middle, and numerous metallic dots from the base to the costal margin. *Hindwing* with two rufous bands, the first, with a row of black spots, below the middle, the second near the outer margin, with a metallic streak crossing both the rufous bands; several metallic spots close to the base." (*Druce*, l. c.)

Druce's "figure, which is extremely rough, represents the species with three to four tails to the hindwing; but either the fourth [uppermost] has been broken off in all the examples which I have examined, or does not really exist." (*Butler*, l. c.)

Description : "Male. Upperside, *both wings* smoky purplish-black, obscurely shot with purple in some lights. *Forewing* with the lower discal and basal areas powdered with dull blue scales, which are obsolete in some specimens. *Hindwing* with two very fine silvery lines on the margin at the anal angle. *Tails* black, tipped with white. *Cilia* blackish, marked with white towards the anal angle of the forewing, and throughout the hindwing. Underside, *both wings* chrome-yellow, densely and evenly striated with black, and with scattered greenish-silvery metallic spots and streaks, some of which form a marginal series. Female. Upperside, *forewing* pale blue, with the costa, the apex widely, and the outer margin blackish. *Hindwing* with all but the outer margin, which is blackish, pale blue; towards the anal angle there is first a fine pale blue line, then a yellow one defined on both sides by a black one, and then another pale blue line. Underside, *both wings* as in the male." (*de Nicéville*, l. c. in Journ. A. S. B.)

Mr. Otto Möller possesses five males and five females of this species taken in Sikkim in April aud May, and the type male, also obtained by him, is in the collection of the Indian Museum, Calcutta; my own collection contains two males and a female. It appears to be a very rare species, and strictly confined to Sikkim.

What is almost certainly a third species of the genus has been described from Malacca as below.* Though the inner tail at the anal angle of the hindwing is missing, it agrees in the general style of its coloration and markings with the two known species. The sex of the type specimen is not stated, but from Mr. Distant's figure of it I should judge it to be a female.

Below will be found a description of the genus *Semanga*, Distant.† It is monotypic, a single sex only is known, and it occurs in the Malay Peninsula and Borneo. It is said to have three subcostal nervules to the forewing. The genus is apparently nearest allied to *Catapœcilma*, Butler.

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* *Catapœcilma? bubases*, Hewitson. *Hypochrysops bubases*, Hewitson, Ent. Month. Mag., vol. xii, p. 38 (1875); *Catapœcilma? bubases*, Distant, Rhop. Malay., p. 459, n. 2, pl. xliv, fig. 26 (1886). Habitat: Malacca. Expanse: 1·6 inches. Description: "Upperside, *both wings* cerulean-blue with all the margins broadly brown. *Hindwing* with two slender tails, the outer margin rufous, broadest near the anal angle, where it is bordered above and below with silver. Underside, *both wings* rufous, undulated throughout with black, and marked by several irregular black spots, and by numerous small silvery-blue spots, some of which form two submarginal bands." (*Hewitson*, l. c.)

† Genus *Semanga*, Distant, Rhop. Malay., p. 239 (1884). "Forewing, somewhat short and broad; *costal* and *outer margins* slightly convex, *inner* margin very slightly concave; *costal nervure* terminating on the costa a little before the end of the discoidal cell, where it is somewhat recurved; *first subcostal nervule* emitted at about one-third before the end of the cell, *second* subcostal about midway between the first and third, *third* subcostal at the end of the cell, third and *fourth* bifurcating at about two-thirds the length of the third; *disco-cellular* nervules somewhat oblique; *third median* nervule emitted at about the end of the cell, *second* median emitted about two-thirds nearer the base of the third than the base of the first. Hindwing, subovate; *costal margin* rounded at base and then straight and oblique to the apex, *apex* obtuse, *posterior margin* rounded, very slightly waved or scalloped, with three slender *tails* situated at the apices of the median nervules; *abdominal* margin concavely excavated a little below [above] the anal angle; *costal nervure* extending to about the apex; *subcostal nervules* bifurcating a little before the end of the cell, and opposite to the apparently common origin of the third and second median nervules; *submedian nervure* slightly curved outwardly, *internal* nervure strongly curved inwardly. *Palpi* robust and porrect, the second joint clothed with coarse and closely compressed hairs and extending for two-thirds its length before the eyes, apical joint much more slender than the second, but moderately robust. Body robust."

"*Semanga* is founded on a species already received from both Borneo and the Malay Peninsula, and its colour affinities are with *Catapœcilma*, Butler, especially by the metallic markings of the underside of the hindwing; an additional subcostal nervule to the forewing, however, sufficiently separates it from that genus." (*Distant*, l. c.)

I have not seen a specimen of any species of this genus, but as described and figured by Mr. Distant it differs remarkably from *Catapœcilma* in having the inner tail to the hindwing the longest, the middle tail half as long, the outer tail half as long as the middle tail; in *Catapœcilma* the inner tail is at the apex of the submedian nervure, in *Semanga* it is at the apex of the first median nervule, consequently the outermost tail arises from the end of the third median nervule, these being very important structural differences between the two genera. The female of the type species is alone known, so whether or no the male has secondary sexual characters must await solution till that sex is discovered.

Semanga superba, Druce. *Ilerda? superba*, Druce, Proc. Zool. Soc. Lond., 1873, p. 350, n. 1, pl. xxxii, fig. 11, *? female*; *Semanga superba*, Distant, Rhop. Malay., p. 239, n. 1, pl. xxi, fig. 13, *female* (1884). Habitat: Malacca, Borneo. Expanse: *Female*, 1·12 inches. Description: "Upperside, *both wings* dark lilac-blue, costal and outer margins dark brown. *Hindwing* with three orange spots close to the anal angle, and a narrow white line round the outer margin. Underside, *both wings* pale brown. *Forewing* crossed near the middle by a rufous band. *Hindwing* with the apical half red, crossed by a broken blue line, with a row of black spots close to the outer margin; three orange spots at the anal angle." (*Druce*, l. c.)

Genus 161.—BIDUANDA, Distant. (PLATE XXIX).

Biduanda, Distant, Rhop. Malay., p. 237 (1884).

"FOREWING, globosely subtriangular, *costal margin* arched, *outer* margin convex, *inner* margin nearly straight; *costal nervure* terminating on the costa before the apex of the cell *first subcostal nervule* emitted about the middle of the cell, *second* about midway between the first and the third, *third* arising a little before the end of the cell, third and *fourth* bifurcating at a short distance from the apex of the wing; *disco-cellular* nervules somewhat perpendicular; *third median* nervule emitted at the end of the cell, *second* nearer to the first than to the third, *first* emitted beyond the middle of the cell. HINDWING, subovate, *costal margin* arched at the base, and then straight and strongly oblique to the apex, which is obtuse, *posterior* margin as in *Drupadia*, Moore, *abdominal* margin angulated but not so strongly cleft as in that genus; *costal nervure* reaching the apex of the wing; other neuration much as in *Drupadia*. Type, *Myrina thesmia*, Hewitson." (*Distant*, l. c.)

In the forewing the costa is evenly arched throughout, the apex is rather rounded, the outer margin slightly convex, the inner angle rounded, the inner margin strongly bowed outwardly in the middle in the male, nearly straight in the female; the costal nervure is unusually short, ending some distance before the apex of the discoidal cell, the base of the second subcostal nervule is slightly nearer to the base of the first than it is to the base of the upper discoidal, the third subcostal nervule is very short, emitted close to the apex of the wing; the middle disco-cellular nervule is emitted from the upper discoidal a short distance from its base, the lower disco-cellular is slightly longer than the upper, both are upright, and in one straight line; the second median nervule is emitted a short distance before the apex of the cell; the submedian nervure is slightly sinuous. In the hindwing the costa is very strongly and regularly arched in the male, much less arched in the female, the apex is very much rounded in the male, less so in the female, the outer margin strongly angled at the termination of the second median nervule, the abdominal margin is rather deeply incised above the anal lobe; the costal nervure hardly reaches the apex of the wing, the disco-cellular nervules are almost in one straight line, slightly outwardly oblique, the second median nervule is emitted a little before the lower end of the cell, the internal nervure is long and recurved; there is a distinct anal lobe and three tails, the outermost at the end of the second median nervule the shortest of all, reduced to a mere notch in the male of *B. thesmia*, Hewitson, but quite distinct and well-formed in the female; the middle tail at the end of the first median nervule the longest; the innermost tail at the end of the submedian nervure half as long as the middle tail. The secondary sexual characters in the male consist of the strongly bowed inner margin of the forewing covering a glandular patch of black differently-formed scales on the upperside of the hindwing placed around the base of the first subcostal nervule, the larger portion of the patch lying between that nervule and the costal nervure. Eyes naked.

Mr. Distant describes the inner margin of the forewing of the type of the genus, *B. thesmia*, Hewitson, as "nearly straight." Hewitson quite correctly described it as regards the male as "curved, projecting;" it is, however, nearly straight in the female.

"FEMALE. UPPERSIDE, *forewing* dark violaceous, with the costal and outer margins (broadest at the apex) dark fuscous. *Hindwing* with the costal, posterior and abdominal margins fuscous, the posterior margin darkest, and containing some irregularly sized and arranged ochraceous submarginal spots, one below the first median nervule and the submedian nervure, and one at lobular anal angle, each containing a dark fuscous centre; these spots are followed outwardly by a narrow whitish line, and the apices of the *tails* are also whitish. UNDERSIDE, *both wings* pale brownish. *Forewing* crossed by a narrow pale castaneous fascia, outwardly bordered with greyish, commencing at lower subcostal nervule and terminating at submedian nervure, and there are faint indications of a greyish submarginal fascia, which is only clearly visible at the posterior angle. *Hindwing* with the apical half reddish-ochraceous, containing firstly an irregular transverse series of metallic bluish spots, followed by a more or less obscure and very irregular series of black spots, the outer margin broadly blackish, powdered with metallic bluish scales, and with a pale submarginal whitish line; a distinct black spot at lobular anal angle, inwardly margined with bluish. *Body* above more or less concolorous with the wings, beneath greyish; *legs* greyish, annulated with dark brownish."

"I have not seen the male of this species, which will probably prove to be similar to the female, but without the broad blackish margins to the upperside of the wings." (*Distant*, l. c.)

In Mr. Druce's figure of this species the basal half of the hindwing on the underside is white, in Mr. Distant's figure it is concolorous with the rest of the wings. The appearance of the two figures is therefore entirely different.

I include in this genus the *Myrina melisa, M. cyara,* and *M. scæva,* all of Hewitson. They are rather small butterflies, with three tails to the hindwing, and a very persistent style of markings on the underside; these consist of a large brown blotch at the apex of the forewing in both sexes of *B. scæva* and in the male of *B. melisa,* but before the apex in the females of *B. melisa* and *B. cyara*; and with numerous brown spots and lines covering the base and disc of both wings on the underside in all of them. The males of *B. melisa* and *B. scæva* have the outer half of the hindwing on the upperside rich metallic blue, with a patch of blue in the middle of the disc of the forewing also in the latter; the female of *B. melisa* is also blue on the hindwing, with a patch of white on the disc of the forewing; the female of *B. scæva* is fuscous on the upperside, with the outer third of the hindwing white. Of these three species I possess but a single male specimen of *B. melisa,* and a pair of *B. scæva,* all of which differ in many points of structure from *B. thesmia,* remarkably so in having the inner margin of the forewing less strongly outwardly bowed, the costal nervure and first and second subcostal nervules more widely separated owing to the costa being more arched, and the antennæ being shorter. It is more than probable that these three species represent a genus or even genera distinct from *Biduanda,* but the matter must rest in abeyance, as far at any rate as I am concerned, until specimens can be obtained in sufficient numbers to enable me to sacrifice one of each species by bleaching the wings so that I can study their venation carefully.

The genus *Biduanda* is a small but very interesting one. Its known distribution at present is confined to Sikkim, Burma, the Malay peninsula, Nias and Daat Islands, Sumatra and Borneo: its range will doubtless hereafter be greatly extended in the Malay Archipelago. Mr. Moore described a species which he called "*Drupadia fabricii*" from Burma. It is not a *Drupadia* at all, as the outline of the hindwing in the male is normal, the costal nervure reaches the apex of the wing instead of terminating about the middle of the costa as it does in the genus *Drupadia,* and both sexes have three instead of two subcostal nervules to the forewing. I am unable even to maintain the species as distinct, as it appears to have no constant characters by which it can be distinguished from *Biduanda thesmia,* Hewitson.

The markings of the underside in some of the species of the genera *Biduanda* and *Drupadia* are strikingly similar; whether this is due to mimicry or not I am unable to say.

Mr. Doherty records the following note on the genus. "*Drupadia* differs from *Biduanda* in having the third subcostal nervule [I call this vein the terminal portion of the subcostal nervure] undivided (in *Biduanda* it is forked just before its termination), and a conspicuous sex-mark on the hindwing on the upperside between the bases of the costal and subcostal nervures. Nevertheless the two genera are extremely similar in the entire structure of the egg, the [newly-born] larva, and the imago, and in any system of classification ought to be brought together." (Journ. A. S. B., vol. lviii, pt. 2, p. (1889).

Key to the Indian species of Biduanda.

A. Both sexes, underside, forewing with the discal band narrow throughout.
   a. Male, upperside, hindwing not densely irrorated with bluish-white scales.
      969. B. THESMIA, Burma, Malay Peninsula, Nias and Daat Islands, Sumatra.
   b. Male, upperside, hindwing densely irrorated with bluish-white scales.
      970. B. SCUDDERII, Burma.
B. Both sexes, underside, forewing with the anterior portion of the discal band three or four times as broad as the posterior portion below the second median nervule.
   a. Both sexes with the anal half of the hindwing on the upperside cerulean blue, female with a discal white patch on the forewing.
      971. B. MELISA, Sikkim, Burma.
   b. Female (?) with the entire hindwing on the upperside rufous-brown, a bifid orange patch on the disc of the forewing.
      972. B. CYARA, Sikkim.
   c. Male, upperside, both wings rich dark violet, with an even narrow outer black margin; hindwing irrorated with white at the anal angle.
      973. B. NICEVILLEI, Burma.

969. **Biduanda thesmia,** Hewitson. (PLATE XXIX, FIG. 229 ♂).

Myrina thesmia, Hewitson, Ill. Diurn. Lep., p. 32, n. 16, pl. xiv, figs. 25, 27, *male*; 26, *female* (1863); *Biduanda thesmia*, Distant, Rhop. Malay., p. 238, n. 1, figs. 76, *male*; 77, *female* (1884); id., Doherty, Journ. A. S. B., vol. lviii, pt. 2, p. (1889); *Drupadia fabricii*, Moore, Journ. A. S. B., vol. liii, pt. 2, p. 32 (1884); *Biduanda fabricii*, id., Journ. Linn. Soc. Lond., Zoology, vol. xxi, p. 42, pl. iv, figs. 2, *male*; 3, *femal* (1886).

HABITAT: Burma, Malay Peninsula, Nias and Daat Islands, Sumatra.

EXPANSE: ♂, 1·25 to 1·60; ♀, 1·20 to 1·50 inches.

DESCRIPTION: "MALE. UPPERSIDE, *both wings* purple-brown. *Forewing* with the inner margin curved, projecting. *Hindwing* with the outer margin and base of the tails black; a submarginal line between the tails, the *cilia*, and the three *tails*, white. UNDERSIDE, *forewing* rufous-orange, with two spots in and below the cell, a spot at the end of the cell, three transverse lines (the first, which is near the second, indistinct), the outer margin, and the *cilia*, all brown. *Hindwing* white (the apex rufous), with eight brown spots, followed by several zigzag black lines; the caudal spot, the lobe, and the space between them crowned with silvery blue; a spot above the [anal] lobe also powdered with blue; the outer margin black; the *cilia* white. FEMALE. UPPERSIDE does not differ from the male, except that it is rufous-brown, and has the anal angle of the *hindwing* grey, marked with the caudal spots."

"Closely allied to *M.* [=*Drupadia*] *ravindra*, Horsfield, [from Java and Nias]; although the males are very different, the females are alike on the upperside. On the underside this species differs from *D. ravindra* chiefly in having the lower spots of the hindwing represented by double lines [in *D. ravindra* they are solid. The coloration of the ground is very different]. A male has a rufous spot in the middle of the forewing, as represented in the figure." (*Hewitson*, l. c.)

"I cannot find any constant difference between Mergui [specimens of *B. fabricii*, Moore] and Perak specimens [of *B. thesmia*]." (*Doherty*, l. c.)

I quite agree with Mr. Doherty's note above as regards the males from Burma and the Malay Peninsula, as they seem to be practically identical, but the Burmese females have always a very much larger orange patch on the upperside of the forewing than the females from the Malay Peninsula, and the latter have usually a greater extent of white irroration in the anal region of the hindwing on the upperside than the former. I append a description of *B. fabricii*.*

Dr. J. Anderson obtained this species in considerable numbers in December, January and March in the Mergui Archipelago; Major C. T. Bingham captured a single male specimen on the Donat Range, Upper Tenasserim, in April; Mr. Doherty found it in the cold season of 1888-89 both at Mergui and at Myitta in the Tenasserim valley; it appears to occur throughout the length of the Malay Peninsula, and in the Islands of Daat, Nias, and Sumatra.

The figure shews both sides of a male specimen from the Mergui Archipelago now in the collection of the Indian Museum, Calcutta.

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* *Biduanda fabricii*, Moore. *Drupadia fabricii*, Moore, Journ. A. S. B., vol. liii, pt. 2, p. 32 (1884); *Biduanda fabricii*, id., Journ. Linn. Soc. Lond., Zoology, vol. xxi, p. 42, pl. iv, figs. 2, *male*; 3, *female* (1886). HABITAT: Mergui Archipelago EXPANSE: *Male* and *female*, 1·25 to 1·37 inches. DESCRIPTION: "MALE. UPPERSIDE, *both wings* similar to the same sex of *Biduanda thesmia*, Hewitson, except that on the *forewing* there is a less amount of cuprescent-red on the disc. UNDERSIDE, *forewing* paler, the markings within the cell, the discal and marginal bands uniformly paler. *Hindwing* with the basal and discal spots brown, and much less defined." (*Moore*, l. c. in Journ. Linn. Soc.) "FEMALE. UPPERSIDE, *forewing* violet-brown, with a slightly broader and more irregular-shaped oblique medial red band than in the female of the typical *Drupadia lisias*, Fabricius, the band also having its outer border scalloped. *Hindwing* paler brown, with grey-bordered anal marginal spots. UNDERSIDE, *forewing* also differs from *Drupadia lisias* in the apical area being suffused with a dusky tint; at the base of the cell is a small round pale-bordered spot, not an elongated triangular mark as in *Drupadia lisias*, the short band crossing the middle of the cell is black, the streak at the end of the cell is more distinct, the transverse discal band black-lined and blackish internally at the upper end, the submarginal line also being broader and more prominent. *Hindwing* with the markings less prominent than in *Drupadia lisias*, the basal bar shorter, the outer costal narrow streak further from the second, the first bar between the subcostal nervules being midway below the two outer costal [spots, instead of being in continuation of the inner of these two spots], the three subbasal spots are small and widely-separated, the bar at the end of the cell and the spot beneath it are pale-centred, the zigzag discal interrupted band is composed of duplex streaks, which are wide apart with the interspace white." (*Moore*, l. c. in Journ. A. S. B.) "The forewing of the female on the upperside has a broad, irregular-shaped, oblique median red band, whereas in *Biduanda thesmia* the band is nearly obsolete." (*Moore*, l. c. in Journ. Linn. Soc.)

970. **Biduanda scudderii,** Doherty.

B. scudderii, Doherty, Journ. A. S. B., vol. lviii, pt. 2, p. (1889).

HABITAT: Mergui, Burma.

EXPANSE: ♂, 1·1 inches.

DESCRIPTION: "Allied to *B. thesmia*, Hewitson, and somewhat resembling the female of that species. MALE. UPPERSIDE, *both wings* dark fuscous. *Forewing* with an orange area occupying about a sixth of the surface, including the lower angle of the discoidal cell, and the disc from the base of the lower discoidal to below the first median nervule; a somewhat large, obscure violet-blue subapical area (not refulgent in any light), not reaching the costa or the outer margin; the inner margin is also tinged with violet. *Hindwing* dull fuscous, a large dull violet area between the second subcostal and the first median nervules from the discoidal cell to the marginal black line, its inner part densely irrorated with bluish-white scales, beyond which lies a transverse darker discal fascia; subanal area nearly black; *cilia* whitish subanally; *tails* chiefly black, except at the tip. UNDERSIDE, *both wings* much as in *B. thesmia*, Hewitson." (*Doherty*, l. c.)

I have seen the type and only known specimen of this pretty little species. The obscure violet-blue coloration of the upperside is only seen in a strong light, in a dull light it is quite invisible. The bluish-white irrorated disc of the hindwing above is very distinctive.

971. **Biduanda melisa,** Hewitson.

Myrina melisa, Hewitson, Ill. Diurn. Lep., Suppl. p. 6, n. 57, pl. iii, figs. 82, 83, *female* (1869); *Biduanda melisa*, Doherty, Journ. A. S. B., vol. lviii, pt. 2, p. (1889).

HABITAT: Darjeeling and Maulmain (*Hewitson*); Burma.

EXPANSE: ♂, ·9 to 1·1; ♀, 1·1 inches.

DESCRIPTION: "MALE. UPPERSIDE, *both wings* dark brown. *Hindwing* with two [three] tails, the anal half cerulean blue, marked by two lunular black spots; the *cilia* and a submarginal line at the base of the tails, white. UNDERSIDE, *both wings* white. *Forewing* with three spots near the base, a large spot beyond the middle of the costal margin, a spot and some lines below it, and the apex, rufous-brown. *Hindwing* with many outline spots of brown, the anal angle silvery blue, with two black spots. FEMALE does not differ from the male, except in having a medial white spot in the *forewing* on the UPPERSIDE."

"Nearly allied to *M.* [*B.*] *scæva*, [Hewitson, from Singapore], but differs from it in being without the blue medial spot of the forewing on the upperside, and in having the spots on the underside in outline only." (*Hewitson*, l. c.)

I possess a single male specimen of this species taken by Major C. T. Bingham in the Pegu Hills in December. It is remarkable in having the costal margin of the hindwing on the upperside broadly orange. This feature is not described by Mr. Hewitson, but as it is hidden when the insect is set by the overlapping inner margin of the forewing, it may have been overlooked by him. The female not only differs from the male in having the white patch on the upperside of the forewing not present in the other sex, but also on the underside in the costal brown patch of the same wing not nearly extending to the apex, as it does in the male. Mr. Doherty notes (l. c.) "One male of this rare little species taken at Myitta, Tenasserim valley. A similar kind occurs at high elevations in Perak, but whether it is this species or *B. scæva*, Hewitson, I am unable to say."

972. **Biduanda cyara,** Hewitson.

Myrina cyara, Hewitson, Ill. Diurn. Lep., Suppl., p. 26, n. 73, pl. iii*b*, figs. 109, 110 (1878).

HABITAT: Darjeeling (*Hewitson*).

EXPANSE: 1·35 inches.

DESCRIPTION: "UPPERSIDE, *both wings* rufous-brown. *Forewing* with a medial bifid orange spot. *Hindwing* with three *tails*, and three black caudal spots crowned with white, and bordered below with white; the outer margin black. *Cilia* white. UNDERSIDE, *both*

wings grey and white, marked by several brown spots and black lines. *Forewing* with a large brown spot beyond the middle [on the costa], the outer margin rufous-brown. *Hindwing* with a caudal black spot, crowned with gold." (*Hewitson*, l. c.)

Mr. Hewitson does not attempt to describe in detail the numerous markings which cover the entire surface of both wings on the underside, most of which are in outline only, nor does he state the sex of the type specimen, which appears to me to be almost certainly a female. It should not be easily mistaken for any other species; the markings of the underside, combined with three tails to the hindwing and a discal orange patch on the upperside of the forewing, rendering it quite unique. I have not seen a specimen.

I append a description of the *Myrina scæva* of Hewitson, described from Singapore, but not included by Mr. Distant in his work on the butterflies of the Malay Peninsula.*

973. **Biduanda nicévillei**, Doherty.

B. nicévillei, Doherty, Journn. A. S. B., vol. lviii, pt. 2, p. (1889).

HABITAT: Myitta, Tenasserim Valley, Burma.

EXPANSE: ♂, 1·2 inches.

DESCRIPTION: "MALE. UPPERSIDE, *both wings* violet, (much richer and bluer than in *B. thesmia*, Hewitson), slightly paler in the middle of the forewing; a narrow, even, black border. *Hindwing* with two subanal black spots bordered inwardly by an area irrorated with whitish scales; a marginal black and white line subanally; the *cilia* partly white, as well as most of the *tails*. UNDERSIDE, *both wings*, much like *B. melisa*, Hewitson, the markings more rufous, less fuscous, the basal spots simple, not annular. *Forewing* with the transverse discal band and the outer margin rufous-brown and ferruginous of various shades. *Hindwing* with the apical part of the outer margin light ferruginous, the metallic green anal area large, extending unbroken from the third median nervule to the internal nervure, the submarginal line straighter, and less undulated on both wings." (*Doherty*, l. c.)

Mr. Doherty obtained two males of this very distinct species at Myitta, Tenasserim Valley, in the cold weather. The rich purple upperside, with an even outer black border about one-sixteenth of an inch in breadth, will easily distinguish this from all the known species of the genus.

I append a description of *B. cinesoides*, mihi, which occurs in the Malay Peninsula.† It has a distinct "male-mark" on the upperside of the forewing on the disc.

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* *Biduanda scæva*, Hewitson. *Myrina scæva*, Hewitson, Ill. Diurn. Lep., p. 30, n. 11, pl. xv, figs. 39, 40, *male* (1863). HABITAT: Singapore. EXPANSE: *Male*, 1·05 inches. DESCRIPTION: "MALE. UPPERSIDE, *both wings* dark brown. *Forewing* with a medial spot of blue dots. *Hindwing* cerulean silvery blue; the base, the costal margin, and the outer margin from the apex to the middle, dark brown; two caudal spots and the three *tails* black; a submarginal line and the *cilia* white. UNDERSIDE, *both wings* white. *Forewing* with a triangular spot on the costal margin, the apex, and outer margin, rufous-brown; the base, two large spots in and below the cell, the end of the cell, several spots on the costal margin, a broken macular band beyond the middle, and a submarginal line, all black. *Hindwing* with several spots, short lines in pairs, a submarginal line, and the outer margin, black; the caudal black spots crowned with silvery blue." (*Hewitson*, l. c.)

This species appears to have the markings on the underside so characteristic of *B. melisa* and *B. cyara*, Hewitson. The male may be distinguished from that sex of *B. melisa* by the presence of the small irrorated blue spot on the upperside of the forewing. All the markings on the underside of *B. scæva* appear to be better defined, and of a darker and richer brown than in *B. melisa*. I have not seen a specimen.

† *Biduanda cinesoides*, de Nicéville, Journ. Bombay Nat. Hist. Soc., vol. iv, p. 166, n. 5, pl. A, fig. 7, *male* (1889). HABITAT: Selangore, Malay Peninsula. EXPANSE: *Male*, 1·6 inches. DESCRIPTION: MALE. UPPERSIDE, *both wings* violet-blue. *Forewing* with a marginal narrow black line; a large round black glandular patch of modified scales beyond the end of the cell, extending slightly into it, anteriorly bounded by the upper discoidal nervule, posteriorly by the second median nervule. *Hindwing* with an oblique black band extending from the base of the short outermost tail to the abdominal margin above the anal notch, beyond which the outer margin is white, bearing a very fine black line; the tails white, black at their bases; a very large intensely black elongated patch of modified glandular scales below the costa. *Cilia* of the forewing blackish, of the hindwing anteriorly blackish, posteriorly white. UNDERSIDE, *forewing* orange-rufous, the inner margin broadly pale and highly polished. *Hindwing* with the anterior half orange-rufous, gradually merging into the white area of the posterior half of the wing; an oblique zigzag narrow black band extending from the middle of the abdominal margin to near the end of the second subcostal nervule, where the band is much attenuated and turned upwards parallel with the outer margin; beyond this narrow band is another still narrower and more zigzag band enclosing a ferruginous line, with a band of metallic amethystine-violet placed outwardly against it, the inner portion of the latter above the anal notch enclosed by a short black line centred with ferruginous; a black spot on the anal lobe, and another larger one in the first median interspace just within the margin; a fine marginal black line; tails as above."

Genus 162.—DRUPADIA, Moore. (PLATE XXIX).

Drupadia,* Moore, Journ. A. S. B., vol. liii, pt. 2, p. 31 (1884); id., Distant, Rhop. Malay., p. 236 (1884).

"FOREWING, differs from typical *Hypolycæna*, Felder, in its more triangular form, the *costa* being longer and more regularly convex, the *exterior margin* more oblique, and the *posterior* margin shorter and convex towards the base [in the male only, this convexed portion placed opposite to an oval glandular patch of scales differently-formed to those on the rest of the wing, and lying on both sides of the submedian nervure near its base]. HINDWING, somewhat shorter, the *costa* being very convex in the middle, the *exterior margin* truncated from the second median nervule; with three *tails*, the middle one long, the others short. *Palpi* with the second joint much longer, and the third shorter and stouter [than in *Hypolycæna*]. MALE with a prominent glandular patch of scales between the costal and subcostal nervures on the upperside of the hindwing, lacking in the female. Type, *Myrina ravindra*, Horsfield." (*Moore*, l. c.)

"This genus is allied to *Catapæcilma*, Butler, in having only three subcostal nervules to the forewing, and in possessing three tails to the hindwing. The differential points exist most strongly in the hindwing, which [in the male] is convex at the base and then strongly oblique to the apex, which is subacute; the posterior margin is oblique to the apex of the second median nervule, when it is [suddenly] more produced, and contains a tail at the apices of the second and first median nervules and of the submedian nervure; the abdominal margin is very strongly cleft near the anal angle; the costal nervure does not extend to about the apex of the wing as in *Catapæcilma*, but terminates on the costal margin at about two-thirds of its length; the subcostal nervules bifurcate a little beyond the middle of the cell, and the third and second median nervules have an apparently common origin a little before the end of the cell; the internal nervure is straight, and terminates just above the excavation of the abdominal margin. The palpi are robust and porrect, projecting fully two-thirds of their length beyond the eyes; the second joint clothed with coarse adpressed hairs; the third joint is slender compared with the second joint, but robust compared with the corresponding joint of many other somewhat allied genera; the palpi are longer in the female than in the male. Legs moderately robust." Eyes naked.

"*Drupadia* superficially resembles the genus *Biduanda*, Distant; and, as arranged by Mr. Moore, it included the species which here stands as the type of *Biduanda* [*thesmia*, Hewitson]. The resemblance, however, is only superficial, as one genus possesses three subcostal nervules to the forewing, and the other genus is provided with four." (*Distant*, l. c.)

In the forewing of *Drupadia boisduvalii*, Moore, the costal nervure terminates about opposite to the apex of the discoidal cell, the second subcostal nervule is given off from the subcostal nervure rather nearer to the base of the first than to that of the upper discoidal; the middle disco-cellular is shorter than the lower, both are concave and slightly inwardly oblique; the second median nervule is given off some little distance before the end of the cell; in the male there is a patch of glandular scales on either side of the submedian nervure near the base on the underside of the wing, and the inner margin of the wing is strongly bowed outwards below this point; in the female there is no glandular patch, and the inner margin is straight. Mr. Distant describes the hindwing of the male nearly correctly, but does not point out how it differs from that of the female. The hindwing of the male has the costal margin abnormally produced and arched to cover the glandular patch on the inner margin of the forewing, but there is no need for this extension in the female, which has therefore the costa of the hindwing

"Very near to the "*Myrina*" *cinesia* of Hewitson,† from Borneo, from which it appears to differ in the presence of the 'male-mark' on the upperside of the forewing; on the upperside of the hindwing there is a black band in the anal region, with a considerable white band beyond it, which latter is not found in *B. cinesia*, and on the underside of the hindwing in the inner black band being half as wide, the outer band also much narrower, and enclosing a ferruginous line, in *B. cinesia* it is wholly black; the middle tail is also more than one-third longer in my species." (*de Nicéville*, l. c.)

† "*Myrina cinesia*, Hewitson, Ill. Diurn. Lep., p. 29, n. 5, pl. xiii, figs. 18, 19, *male*; 20, *female* (1863).

* This name should fall before *Marmessus* of Hübner, Verz. bek. Schmett., p. 81 (1816), of which the type is the *Papilio lisias* of Fabricius.

only gently and regularly arched; and the costal nervure is much longer (extending nearly to the apex of the wing) than in the male, in which it is extraordinarily short.

This genus cannot be mistaken for any other, being abundantly distinct. From the genera with two subcostal nervules to the forewing and three tails to the hindwing, it may be known, in the male, by the abnormal shape of the hindwing, and the costal nervure reaching to about the middle only of the costal margin, instead of to the apex, as in *Rathinda*, Moore, *Catapœcilma*, Butler, and *Eooxylides*, de Nicéville. It has also a round glandular patch of scales on the hindwing of the male near the costa, which is not found in any of the allied genera. It contains four species only, all of which, except *D. ravindra*, Horsfield, (which occurs in Nias Island (*Kheil*) and Java) are described in this work.

Key to the Indian species of Drupadia.

A. Both sexes, upperside, forewing with discal orange patch small.
974. D. LISIAS, Nicobar Isles.
B. Both sexes, upperside, forewing with discal orange patch large.
975. D. BOISDUVALII, Chittagong Hill Tracts, Burma.

974. Drupadia lisias, Fabricius.

Papilio lisias, Fabricius, Mant. Ins., vol. ii, p. 65, n. 615 (1787); id., Donovan, Ins. India, p. 60, pl. xl, figs. 1, *female* (1800); *Hesperia lisias*, id., Ent. Syst., vol. iii, pt. 1, p. 261, n. 12 (1793); *Myrina lisias*, Godart, Enc. Méth., vol. ix, p. 593, n. 2 (1823); id., Butler, Cat. Fab. Lep. B. M., p. 184, n. 5 (1869); *Hypolycæna lisias*, Moore, Proc. Zool. Soc. Lond., 1878, p. 833; *Drupadia lisias*, Moore, Journ. A. S. B., vol. liii, pt. 2, p. 32 (1884); id., Waterhouse, Aid, vol. ii, pl. clxv, figs. 2, 3*a*, *male*; 3, *female* (1886).

HABITAT: Pulicandor, =Pulo Kondul, one of the Nicobar Isles (*Fabricius*); on this side of the Ganges (*Godart*); India (*Westwood*); Barrackpore (*Butler*); Ahsown; Meetan, April; Moolai, 3—6,000 feet, all in Upper Tenasserim (*Moore*).

EXPANSE: ♂, 1·35; ♀, 1·30 inches.

DESCRIPTION: MALE. UPPERSIDE, *forewing* differs from *D. boisduvalii*, Moore, described below, in the orange patch being much smaller, about half as large, not nearly reaching the outer margin or anal angle. Otherwise as in *D. boisduvalii*. FEMALE. UPPERSIDE, *forewing* also with the orange patch much restricted, even smaller than in the male.

The above description is drawn up from Mr. Waterhouse's figures of the type specimens n "Aid." Mr. Moore identifies "Pulicandor" the habitat of the type specimens with Kondul Island in the Nicobars. Although I have received collections from those islands almost continually for many years, no specimen of this species has reached me from there. It is probable that all the other localities given above for the species are incorrect; they should be applied to *D. boisduvalii*, Moore, except Barrackpore, which is almost certainly entirely erroneous for both. Mr. Butler correctly remarks that "Donovan's figure" of this species "is most incorrect; the hindwing should be dark brown, not fulvous." Mr. Moore also notes "*Drupadia lisias* (*Papilio lisias*, Fabricius), badly figured in Donovan's Insects of India, is distinct from *D. boisduvalii*, Moore. Both sexes of the type of *D. lisias*, Fabricius, are in the British Museum collection." Except these last named specimens, no others are known, and the species has to be rediscovered.

975. Drupadia boisduvalii, Moore. (PLATE XXIX, FIG. 230 ♂).

D. boisduvalii, Moore, Journ. A. S. B., vol. liii, pt. 2, p. 31 (1884); *Biduanda boisduvalii*, id., Journ. Linn. Soc. Lond., Zoology, vol. xxi, p. 42 (1886); *Myrina lisias*, Boisduval (*nec* Fabricius), Sp. Gén., vol. i, pl. xxii, fig. 2, *male* (1836).

HABITAT: Chittagong Hill Tracts, Rangoon, Mergui, Moulmein.

EXPANSE: ♂, 1·25 to 1·45; ♀, 1·20 to 1·50 inches.

DESCRIPTION: "MALE. UPPERSIDE, *forewing* purplish violet-brown, with a broad oblique transverse discal almost quadrate red band. *Hindwing* cobalt-blue, darkest and purplish-violaceous anteriorly; costal border and abdominal margin violet-brown. *Cilia* and

tails edged with white. UNDERSIDE, *forewing* ochreous-red, with a brighter red pale-bordered streak at the base of the cell, a band across the middle of the cell, another at its end, and a similar discal band which has a slightly dusky lunulated border at the upper outer end, a submarginal slender black slightly sinuous line. *Hindwing* white, the costal border and apex being slightly red, with the basal and subbasal spots entirely black ; a duplex slender black streak at the end of the cell, a similar one above it, a discal zigzag duplex line, and a single black submarginal line ; a large anal and a subanal black spot surmounted by metallic-blue scales, which also traverse the intervening subanal space. FEMALE. UPPERSIDE, *forewing* somewhat paler brown than in the male, the red band of the same width and quadrangular form. *Hindwing* pale violet-brown, the discal area somewhat red-streaked ; above the tails are four black spots surmounted by lilac scales." UNDERSIDE, *both wings* as in the male. (*Moore*, l. c.)

This is probably the commonest species of the genus, and seems to be particularly plentiful at Rangoon. It occurs as far north as the Chittagong Hill Tracts, where it was obtained by Mr. H. M. Parish in February and November. The female of this species has a strong superficial resemblance to that sex of *Biduanda thesmia*, Hewitson, and in the Mergui Archipelago the two species occur together. They are very similar on the upperside, but on the underside *D. boisduvalii* may be distinguished by having the apex of the forewing concolorous with the rest of the wing, while *B. thesmia* has it dusky, and moreover the duplex discal band anteriorly filled in with the same colour ; in the hindwing in *D. boisduvalii* the outer double costal bar extends from the costal nervure to the second subcostal nervule, the discal double fascia commences from the second subcostal nervule ; in *B. thesmia* the outer double costal bar crosses the subcostal interspace only, stopping short at the first subcostal nervule, and the discal double fascia commences from the first subcostal nervule instead of from the second. These differences in the hindwing hold good for the males also. I have a strong suspicion that *B. thesmia* is a mimic of *D. boisduvalii* on the underside in both sexes, but on both sides in the female, Mr. Doherty being of opinion that *Drupadia* is a protected genus, of which *Biduanda* is a mimic.

The figure shews both sides of a male specimen in my collection from Rangoon.

D. moorei, Distant, occurs in the Malay Peninsula, Sumatra, and Daat Island. On the upperside of the forewing in the male it resembles *Biduanda thesmia*, Hewitson ; the hindwing however resembles *D. boisduvalii*, Moore, so the male combines the characters of both these species. The female of *D. moorei* differs from Burmese specimens of *B. thesmia* in having only a reddish suffused spot on the disc of the forewing on the upperside instead of a broad orange band, but agrees in this particular with specimens from the Malay Peninsula. Its description is appended.*

* *Drupadia moorei*, Distant. *Sithon moorei*, Distant, Ann. and Mag. of Nat. Hist., fifth series, vol. x, p. 246 (1882) ; *Drupadia moorei*, Distant, Rhop. Malay., p. 236, n. 1, pl. xx, figs. 21, *male* ; 20, 30, *female* (1884) ; idem, id., l. c., p. 460, pl. xliv, fig. 11, *female variety* (1886). HABITAT : Province Wellesley, Perak, Sungei Ujong, Malacca, Singapore, Sumatra, Daat Island, North Borneo. EXPANSE : *Male* and *female*, ·8 to 1·6 inches. DESCRIPTION : "MALE. UPPERSIDE, *forewing* very dark and glossy fuliginous-brown, [sometimes] with an irregular reddish spot or suffusion situated at the end of the cell and at the bases of the median nervules. *Hindwing* bright and somewhat pale bluish ; the posterior margin black, inwardly bordered with white near the anal angle, where there are two transverse black marginal spots ; the *cilia* white ; *tails* blackish, with marginal white cilia ; costal area pale hyaline, darker near base ; upper portion of cell and basal area between subcostal nervules talc-like and pale transparent stramineous ; above, beneath, and beyond which the colour is fuscous. UNDERSIDE, *forewing* reddish-ochraceous ; a broad basal and a transverse medial fuscous streak in the cell, a pale fuscous line at the end of the cell, and two transverse, narrow, waved fuscous fasciæ between the end of the cell and the outer margin. *Hindwing* greyish-white ; the costal margin more or less suffused with reddish-ochraceous, and with ten large fuscous discal spots, the upper six of which are subquadrate but irregular in size, and the posterior four are more irregular in shape, and have their centres more or less greyish ; a submarginal and marginal fuscous line, the first of which is broken and irregular, and between which and the margin is a narrow fuscous streak, leading to a long, pale bluish-fuscous spot ; beneath the sub-marginal line near the abdominal margin are two narrow ochraceous fasciæ, which amalgamate inwardly, and between which the colour is pale metallic-bluish. *Body* above fuliginous-brown, beneath greyish-white. *Legs* greyish-white, annulated and streaked with fuscous. FEMALE. UPPERSIDE, *both wings* much paler than in the male. *Hindwing* pale fuliginous-brown, excepting near the anal angle, where there is an obscure bluish patch with a few obscure fuscous marginal spots. UNDERSIDE, *both wings* as in the male, but the *forewing* paler in hue."

Genus 163.—EOOXYLIDES, nov. (Plate XXIX).

Forewing, *costa* considerably arched, slightly indented at the base; *apex* rather acute in the male, much rounded in the female, *outer margin* nearly straight, perhaps slightly concave in the male, much rounded in the female, *inner* margin straight; *costal nervure* extending to opposite the apex of the discoidal cell; *first subcostal nervule* well separated from the costal nervure, *second* subcostal with its base considerably nearer to the base of the upper discoidal than to that of the first subcostal; *middle disco-cellular* nervule originating from the upper discoidal close to its base, straight, upright, exactly in the same straight line as the *lower* disco-cellular, the latter a little longer than the middle; *second median* nervule given off some little distance before the lower end of the cell; *submedian nervure* sinuous. Male with a circular glandular patch of modified scales on the middle of the disc, occupying the bases of the median interspaces and extending slightly into the cell, bearing itself outwardly in the first median interspace a conspicuous silky perfectly round patch of very densely packed scales. Hindwing, with three *tails*, all highly ciliated ("fluffy"), not filiform, the two at the ends of the second median nervule and submedian nervure very short, the one at the end of the first median nervule very long (about half an inch in length), all the tails traversed more than half way to their apices by their respective veins; *costa* much arched at base, then straight to apex, *outer margin* increasingly sinuous; *abdominal* margin deeply excavated below the apex of the internal nervure; *costal nervure* arched at base, then straight to apex, which it reaches; *first subcostal nervule* gently arched at base; *disco-cellular* nervules almost in one straight line, slightly outwardly oblique, the upper somewhat shorter than the lower; *second median* nervule originating at the lower end of the cell; *submedian nervure* straight; *internal* nervure rather long and sinuous. *Antennæ* short, less than half the length of the costa of the forewing, gradually clavate; *eyes* naked; *body* short, rather robust. Type, the "*Oxylides*" *tharis* of Hübner.

Mr. W. Doherty, who has closely studied these butterflies in life, places this genus, *Yasoda*, Doherty, MS., and *Loxura*, Horsfield, in a subfamily which he names *Loxurinæ*. He has given me the following MS. notes on the subject: "The *Loxurinæ* seem to come between the *Amblypodias* and *Theclas*. *Loxura* most nearly approaches the former, and *Eooxylides* the latter. The egg resembles that of one group of the *Amblypodias*, which, however, lacks the apical carina. It is also something like those of the first genera of the *Theclas*, such as *Drupadia*, Moore. These differ from the *Loxurinæ* in the absence of the carina, and in the great size and depth of the green depressions (which in the *Loxurinæ* are minute), and from the other *Theclas* in the smoothly-rounded white coating, free from tubercles. The young larvæ of the *Loxurinæ* are somewhat intermediate between those of *Drupadia* and the above-mentioned group of the *Amblypodias*, but possess peculiar features of their own."

"As a group, the *Loxurinæ* are very slow in flight, and not at all timid; they are very conspicuous, being bright orange in colouring, though *Eooxylides* is black above. The

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"This species varies very much in size, and is probably somewhat widely distributed. It is allied to the *Myrina ravindra*, Horsfield, a Javan species which belongs to, and is the type of, this genus. We thus find *D. moorei* inhabiting Borneo, Sumatra, and the Malay Peninsula, and differing from a closely-allied Javan species, as is so frequently the case in all branches of Malayan Zoology, and has been so well and ably pointed out by Mr. Wallace." (*Distant*, l. c. in Rhop. Malay.)

D. moorei, Distant, is very much nearer to *D. boisduvalii*, Moore, than to *D. ravindra*, Horsfield; it differs from the former in both sexes on the upperside in having the orange band almost obliterated, reduced to a few irrorations only or entirely absent, and on the underside in all the markings being much heavier and darker. I have seen numerous specimens of this species from Singapore, Silangor, and North Borneo, kindly sent to me by Mr. W. Davison. Mr. Doherty notes (Journ. A. S. B., vol. lviii, pt. 2, p. (1889), that he "cannot find any constant difference between Mergui [specimens of *D. boisduvalii*] and Perak specimens" [of *D. moorei*]. As far as I am able to judge from the material at my disposal, the two species can be distinguished at a glance. *D. boisduvalii* on the upperside of the forewing in both sexes has two-thirds of the surface orange, this colour in *D. moorei* is confined to a very small patch in the middle of the disc, or is entirely absent. A perfect gradation between these two extremes may however be hereafter obtained. The differences between Burmese specimens of *Biduanda thesmia*, Hewitson (=*B. fabricii*, Moore,) and typical specimens of that species from the Malay Peninsula are almost exactly paralleled in *Drupadia boisduvalii* and *D. moorei*, but whereas in the former the males from both regions are almost identical, though the females differ considerably, in the latter the two sexes are widely different.

antennæ are short, and very gradually clavate. I counted about forty joints in *Loxura* and *Eooxylides,* and thirty-five in *Yasoda.* The eyes are naked, the palpi are very long and porrect, the costa of the forewing is very convex, the two bifurcations of the median nervure of the forewing are very close together in the male. The legs are short, thick and scaly. The fore tarsi of the female are longer than the tibiæ in *Loxura,* shorter in the others. They are spinous, five-jointed, with the underside emarginate, scaleless, and finely pubescent, edged by lines of strong spines (less prominent in *Eooxylides*), the first joint about as long, or longer (*Loxura*) than the others united; the pulvillus broad and truncate, with four terminal hairs, two minute, slender, hairy paronychia, and two small simple claws almost hidden. The fore tarsi of the male resemble those of *Drupadia* and in a less degree those of the *Amblypodias;* they are slender, scaly, with two lines of spines underneath (obsolescent in *Eooxylides*), ending in a mass of short spines bent at a right angle with the tarsus. The tarsus is not articulated, and is much shorter than the tibia; in *Loxura* there seem to be paronychia.* The tibia is shorter than the femur (except in *Loxura*), and in *Loxura* has two long unequal appressed terminal spines, obsolescent in the other genera. *Eooxylides* has the first joint of all the tarsi greatly enlarged, the others tapering; this is also the case to a less extent with *Yasoda* (but not in the fore feet of the male), while *Loxura* has them all filiform and regular."

"*Eooxylides tharis,* Hübner, is a dominant Oriental species. It is placed by Distant in the genus *Hypolycæna,* Felder, from which the structure of the fore tarsi of the male separates it. Of its position in this group there cannot be much doubt."

I give below† a description of the genus *Oxylides* of Hübner, the type of which, *O. faunus,* Drury, an East African species, is apparently the nearest ally of *Eooxylides.*

As far as is known, *Eooxylides* has but a single species, which is found from Burma through the Malay Peninsula to Java. Mr. Doherty considers it to be a protected genus, and that where *Neocheritra gama,* Distant, occurs, that species mimics it.

976. Eooxylides tharis, Hübner. (Plate XXIX, Fig. 231 ♂).

Oxylides tharis, Hübner, Zutr. Ex. Schmett., figs. 883, 884 (1837); *Myrina tharis,* Horsfield and Moore, Cat. Lep. Mus. E. I. C., vol. i, p. 47, n. 78 (1857); id., Hewitson, Ill., Diurn. Lep., p. 31, n. 12 (1863); *Sithon tharis,* Kheil, Rhop. Ins. Nias, p. 32, n. 108 (1884); *Hypolycæna tharis,* Distant, Rhop. Malay., p. 257, n. 3, pl. xx, fig. 19, *female* (1885); *Myrina pharis,* Doubleday and Hewitson, Gen. Diurn. Lep., vol. ii, p. 476, n. 12, pl. lxxiv, fig. 3, *female* (1852).

Habitat: India (*Horsfield* and *Moore*); Chittagong Hill Tracts, Arakan and Bassein District (*Doherty*), Province Wellesley, Perak, Sungei Ujong, Malacca, Johore, Nias Island, Java.

Expanse: ♂, ♀, 1·2 to 1·5 inches; length of middle tail, ·5 of an inch.

Description: "Upperside, *both wings* brown. *Forewing* [*hindwing*] with a broad band from angle of abdominal margin across the wing to middle of exterior margin; a spot near to, and the margin of anal angle, *tails* and broad *cilia,* pure white. Underside, *forewing* chrome-red, basal half of *hindwing* slightly paler, anal half white, with patches of black disposed at anal angle and between the veins along the exterior margin; across the wing, from the abdominal margin to near the anterior angle (separating the red and white colours), is a zig-zag line." (*Moore,* l. c.)

* "In this group the paronychia of the fore feet are hard to find, being minute, deciduous, and partly concealed by hairs."

† Genus *Oxylides,* Hübner, Verz. bek. Schmett., p. 77 (1816). Male and female. Differ from *Eooxylides,* de Nicéville, in the forewing being shorter, *apex* and *outer margin* much more rounded, *inner margin* shorter; *second subcostal nervule* with its base equi-distant between the bases of the first subcostal and upper discoidal nervules instead of being twice as far apart from the former as in *Eooxylides*; *middle disco-cellular nervule* much shorter; male with no secondary sexual characters. Hindwing with the *first subcostal nervule* arising half as near to the apex of the cell as in *Eooxylides*; the *upper disco-cellular* nervule shorter; the *internal nervure* one-third shorter, owing to the much more shallow but longer excavation above the anal lobe; *tails* similar. *Eyes* naked. *Antennæ* with a well-formed distinct club quite different from the club in *Eooxylides,* the joints apparently far less numerous, as the conspicuous white annulations are much wider apart. Type, the *Papilio faunus* of Drury, from West Africa.

Dr. O. Staudinger has kindly sent me a pair of specimens of this species from Sierra Leone, from which the above description has been drawn up. The male is brillianly blue on the upperside, quite different from *E. tharis,* Hübner.

Both Messrs. Moore and Distant have described this species, but neither of them say what sex they had before them. The male has the outer margin of the forewing very straight, almost concave; the female has it convex and the apex more rounded; the male has a conspicuous deep black shining round discal glandular patch of modified scales on the upperside of the forewing which is crossed by the median nervules; this is of course absent in the female; the male has some scattered blue scales on either side of the submedian nervure. In other respects the opposite sexes do not differ.

Mr. Doherty informs me that it occurs in the Chittagong Hill Tracts, in Arakan, and in the Bassein district; Mr. Distant records it from numerous localities in the Malay Peninsula; it occurs also in the islands of Nias and Java, and probably elsewhere in the Malay Archipelago. In the Indian Museum, Calcutta, are two males from Perak, and a female labelled "India" from the old East India Company's Museum. I append as a foot-note Mr. Distant's description of this species.*

The figure shows both sides of a male specimen from Perak in the collection of the Indian Museum, Calcutta.

The ninth division that I have made in the Indian *Lycænidæ* I have called the *Loxura*† group; it contains two genera only occurring within Indian limits, though Mr. Doherty includes in it the last genus, *Eooxylides*, mihi, which differs from *Loxura*, Horsfield, and *Yasoda*, Doherty, MS., so entirely in appearance and structure. The *Loxura* group, as understood by me, is characterised by having one very long tail to the hindwing, which wing is greatly elongated posteriorly and is lobate at the anal angle. Both genera have both sexes coloured rich orange on the upperside with outer black margins, and the underside yellow. In *Loxura* both sexes have three subcostal nervules to the forewing, in *Yasoda* they have two only. *Loxura* has no secondary sexual characters in the male, while *Yasoda* has an elongated glandular patch of scales on the upperside of the hindwing on the first median nervule, which is quite a unique position amongst the *Lycænidæ* for such a character. The two genera are, I believe, strictly confined to the Indo-Malayan region. Several closely-allied species have been described as appertaining to *Loxura*, two doubtfully distinct species to *Yasoda*.

Genus 164.—LOXURA, Horsfield. (PLATE XXIX).

Loxura, Horsfield, Cat. Lep. E. I. C., p. 119 (1829); id., Moore, Lep. Cey., vol. i, p. 110 (1881); id., Distant, Rhop. Malay., p. 280 (1885).

"FOREWING, subtriangular; *costa* very convex to the tip, *apex* pointed, *exterior margin* straight, slightly oblique, *posterior* margin long, nearly straight; *costal nervure* extending to half the wing; *first*, *second* and *third subcostal nervules* at equal distances apart, first subcostal emitted at more than one-half before the end of the cell, second at one-third, third at one-fifth, *fourth* subcostal at one-half from below the third and terminating at the apex, *fifth* subcostal from a slight angle at the end of the cell; *disco-cellular* nervules slightly concave, erect; radial [*lower*

* UPPERSIDE, *both wings* dark chocolate-brown. *Forewing* with two obscure streaks of scattered bluish scales situated one on each side of the submedian nervure. *Hindwing* with a transverse macular white fascia crossing the wing from the apex of the second subcostal nervule to the notch at the anal angle; beneath this is a white spot at the anal angle and a narrow submarginal white line; submedian nervure tinged with greyish; *tails* white, with faint dark median lines. *Cilia* white. UNDERSIDE, *both wings* ochraceous. *Forewing* reddish-ochraceous. *Hindwing* with the anal angular area largely white, anteriorly defined by a waved blackish line bordered with greyish, and from which some very obscure narrow pale linear fasciæ radiate towards the costa; this white area includes the following black spots:—a submarginal row of six, of which the first, second and fifth are small and linear; above the fifth and sixth is a broad irregular spot, and another is placed above the notch at the anal angle; *tails* and *cilia* as above. *Body* more or less concolorous with the wings; *legs* greyish, broadly annulated with black; *antennæ* dark fuscous, narrowly annulated beneath with greyish." (*Distant*, l. c.)

† See foot-note page 398. This group should be known as the *Myrina* group, as the type species of that genus is evidently closely allied to the species here included in the genus *Loxura*, and *Myrina* is a much older generic name than *Loxura*. The genus *Myrina* differs from *Loxura* according to Mr. Trimen, in the discoidal nervules of the forewing having a common origin at the apex of the cell, so that the middle disco-cellular nervule is obsolete.

discoidal] nervule from their middle ; *discoidal cell* broad, longest at its upper end ; *second median nervule* at one-fifth and *first* median at one-third before the end of the cell ; *submedian nervure* almost straight. HINDWING, short, produced hindwards into a broad lengthened tail ; *exterior margin* even, very oblique below the apex, *abdominal* margin very long, *anal lobe* moderate ; *costal nervure* arched at the base and thence straight to near the apex ; *first subcostal nervule* at one-third before the end of the cell ; *disco-cellular* nervules recurved ; radial [*discoidal* nervule] from their middle ; *discoidal cell* broad ; *third median nervule* from immediately before the end of the cell ; *first* median at nearly one-half before the end ; *submedian nervure* long, extending to the anal angle ; *internal* nervure recurved. BODY small, short ; *palpi* porrect, very long, [still longer in the female than in the male], flattened and squamose throughout, second joint projecting two-thirds beyond the head, third joint half its length ; *legs* short, thick, squamose ; *antennæ* short, one-third only of the length of the costa, thickened throughout their length. *Eyes* naked. Type, *L. atymnus*, Cramer." (*Moore*, l. c.)

In the forewing the costal nervure reaches to opposite the apex of the discoidal cell ; the base of the second subcostal nervule is nearer to that of the upper discoidal than to that of the first subcostal, the third subcostal originates at about the middle of that portion of the subcostal nervure which extends from the apex of the cell to the apex of the wing ; the disco-cellular nervules are concave, of nearly equal length, slightly inwardly oblique ; the median nervules lying close together leave a wide submedian interspace, second median nervule originating just before the lower end of the cell. In the hindwing the costal nervure is arched at base, curved thence to the apex of the wing ; the disco-cellular nervules of about equal length, slightly concave and outwardly oblique, the second median nervule originating just before the lower end of the cell ; tail long, broad at base, traversed for more than half its length by the first median nervule ; anal lobe small, abdominal margin shallowly excavated above the anal lobe. In the female the wings are broader than in the male, and the costa of the forewing is much more arched. The male has no secondary sexual characters.

The transformations of this genus are normal, the larva and pupa presenting no especial peculiarities.

The genus *Loxura* is found almost throughout India, in Ceylon, the Andaman and Nicobar Isles, in Burma, and throughout the Malay Peninsula and Islands. It has a close superficial resemblance to the genus *Yasoda*, Doherty, MS, which follows.

Four species of the genus *Loxura* have been recorded from Indian limits. I am unable to give a single character by which these species can infallibly be identified. Two of them are recorded from islands only, where for countless years they must have been completely shut off from communication with the mainland—a *Loxura* is a very weak-flying insect—and yet the parent form has become but little modified, and what slight modifications have arisen are not constant. Not only are the uppersides of these several so-called species variable in the shade of orange they exhibit, and in the breadth of the outer black margins, but the undersides present the greatest diversity of markings and shades of colour, some specimens being very pale saffron yellow with hardly a single marking, others are deep brownish-yellow, profusely marked over their entire surface. I am quite certain that if a considerable number of specimens of these four recorded Indian species had their locality labels removed and they were mixed up, no one could ever correctly sort them into their respective localities again. Individual specimens may perhaps be recognised if they represent the typical extreme form of the species, but intermediate specimens are quite unrecognisable. I will not attempt to give a key to the species, as from it they could not be determined with certainty were the locality of the specimens lost. I have kept the descriptions of these four species separate to enable students to study them the more easily, though I hold very strongly to the opinion that these so-called distinct species are not even worthy of the rank of local races. They are very conspicuous butterflies on the wing, and are usually to be found amongst trees and bushes, especially bamboos. They have rather a weak flight, and their long tails soon get broken.

977. **Loxura atymnus**, Cramer. (PLATE XXIX, FIG. 232 ♂).

Papilio atymnus, Cramer, Pap. Ex., vol. iv, p. 82, pl. cccxxxi, figs. D, E (1780); id., Fabricius, Mant. Ins., vol. ii, p. 70, n. 662 (1787); id., Donovan, Ins. China, p. 70, pl. xxxix, fig. 1 (1798); *Hesperia atymnus*, id., Ent. Syst., vol. iii, pt. 1, p. 283, n. 88 (1793); *Marmessus atymnus*, Hübner, Verz. bek. Schmett., p. 81, n. 828 (1816); *Myrina atymnus*, Godart, Enc. Méth, vol. ix, p. 594, n. 5 (1823); id., Horsfield, Cat. Lep. E. I. Co., pl. ii figs. 6, 6*a*, *imago*; 6*b-e*, *structure of imago*; *Loxura atymnus*, id., l. c., p. 121, n. 49 (1829); id., Boisduval, Sp. Gén., pl. vii, fig. 3 (1836); id., Horsfield and Moore, Cat. Lep. Mus. E. I. C., vol. i, p. 51, n. 90 (1857); id., Distant, Rhop. Malay., p. 281, n. 1, pl. xxiv, fig. 7, *male* (1885); id., Staudinger, Ex. Schmett., p. 278, pl. xcv, *male* (1888); *Myrina alymnus*, Druce, Proc. Zool. Soc. Lond., 1873, p. 353, n. 1.

HABITAT: Coromandel Coast (*Cramer*); throughout India (except the higher Himalayas and the desert tracts), Burma, Malay Peninsula, the Nicobar Isles, Siam, Nias Island, Java, Borneo, China.

EXPANSE: ♂, ♀, 1·25 to 1·80 inches.

DESCRIPTION: "MALE and FEMALE. UPPERSIDE, *both wings* fulvous, the intensity of the tint varying in different individuals, from florid but not glossy orange to pale saffron yellow. *Forewing* with the exterior and posterior margins blackish-brown, the intermediate boundary being regular, and passing in an arch from the middle of the costa to the inner apical angle, leaving the greatest breadth at the tip. *Hindwing* with a narrower and paler apical border, whose inner edge is slightly dentate and gradually diffused in the ground-colour of the surface, or entirely covered with a diluted yellowish tint; inner margin dirty grayish and downy, lengthened in the direction of the anal appendage, which is irrorated with dusky white. UNDERSIDE, *both wings* covered with a yellow ochraceous pulverulent tint which is uniformly diffused over the whole surface; marked with four brownish parallel strigæ, the two interior ones being very obsolete and apparent only in fresh and well-conditioned specimens, the third extending over the middle of both wings is the most distinct and composed of darkish lunules in close succession, the fourth just within the margin is faint and interrupted. *Hindwing*, the transverse anal extremity is marked with a brownish streak consisting of three confluent spots, which are covered along the margin with whitish irrorations, the inner spot being diffused over the rounded extremity of the anal appendage. *Body* brownish above with a slight admixture of yellow; the thorax bears delicate silky hairs; underneath these parts are covered with a short close whitish down. *Antennæ* brown. *Tail* pale fulvous with an obscure brownish margin and a whitish tip. The FEMALE, according to my observation, can be distinguished only by the structure of the anterior tarsi; in colour and painting it differs not perceptibly from the male." (*Horsfield*, l. c.) The female may also be known from the male by the forewing being broader, the costa more arched, the inner margin is longer than in the male, thus giving the wing a blunter appearance.

In suitable localities, *L. atymnus* may be found almost throughout India. It does not occur in the purely desert tracts of Sind and Rajputana, nor perhaps in the plains of the Punjab or the North Western Provinces. It is common in the outer Himalayas, Bengal, Assam, Burma, Orissa, and in South India, except in the tracts where it is replaced by *L. surya*, Moore In the Nicobars it occurs on Kamorta, Nankowri, Little and Great Nicobar.

The figure shews both sides of a male specimen from Calcutta in my collection.

978. **Loxura surya**, Moore.

L. surya, Moore, Horsfield and Moore, Cat. Lep. Mus. E. I. C., vol. i, p. 52, n. 91, pl. 1*a*, fig. 13, *male* (1857).

HABITAT: Canara (*Moore*), Karwar, Travancore.

EXPANSE: ♂, ♀, 1·4 to 1·6 inches.

DESCRIPTION: MALE. "UPPERSIDE, *both wings* differ from *L. atymnus*, Cramer, in having the fulvous colour more intense and brighter. *Forewing* with the blackish-brown border darker, extending to the base of the wing. and occupying the whole space between the costal nervure and the anterior margin. *Hindwing* with a patch of blackish-brown near the base of

the anterior margin, abdominal margin brown. UNDERSIDE, *both wings* dark ochreous." (*Moore*, l. c.) FEMALE. UPPERSIDE, *forewing* with the outer black border broader than in the male, the base of the wing more dusky. *Hindwing* with almost the entire surface thickly irrorated with black scales. Otherwise as in the male.

This species or local race is probably confined to the heavy damp forests of South India; It was originally recorded from Canara, which is one of the localities Mr. Moore gives for *L. atymnus*. The female I have described above is identical with females of *L. prabha*, Moore. There are specimens of it in the Indian Museum, Calcutta, from Karwar in Canara, and from Travancore.

L. cassiopeia, Distant, a description of which is given below,* is closely allied to *L. surya*. It has been recorded hitherto only from Perak in the Malay Peninsula.

979. **Loxura prabha,** Moore.

Myrina prabha, Moore, Proc. Zool. Soc. Lond., 1877, p. 589, pl. lviii, fig. 5, *female*.

HABITAT : South Andaman Isles.

EXPANSE : ♂, 1·25 to 1·70 ; ♀, 1·50 to 1·80 inches.

DESCRIPTION : " MALE. UPPERSIDE, *both wings* red. *Forewing* with a black apical band, base of wing and costa dusky rufous-brown. *Hindwing* with a blackish costal border, subcostal veins, and narrow border on outer margin, abdominal margin dusky rufous-brown. UNDERSIDE, *both wings* ochreous-yellow, with two outer indistinct rows of small brownish spots on the *forewing*, and two indistinct bands on the *hindwing*, a speckled black-and-white mark at the angle of the tail. FEMALE. UPPERSIDE, *both wings* red. *Forewing* with a broad black apical band and dusky rufous-brown base, *Hindwing* dark rufous-brown, disco-cellular nervules, median and internal nervures, and *tail* streaked with red, tip of tail white. UNDERSIDE, *both wings* as in the male. *Body* black above, white beneath ; *palpi* and *legs* white-speckled."

" Quite a differently-marked insect from its ally *Myrina atymnus*, Cramer." (*Moore*, l. c.)

This species, though from a limited and narrowly restricted locality, shows perhaps as great variation as *L. atymnus*, which has an immense distribution. In the male on the upperside of the forewing the costa is sometimes black, though never so broadly so as in *L. surya*, Moore, and *L. cassiopeia*, Distant, the outer margin of the hindwing is sometimes narrowly black, sometimes concolorous with the rest of the wing. Some females are hardly at all dusky on the upperside, being coloured nearly as in the male. It is a very common species in the Andaman Isles.

980. **Loxura arcuata,** Moore.

L. arcuata, Moore, Lep. Cey., vol. i, p. 111, pl. xlii, figs. 4, *male* ; 4*a*, *female* ; 4*b*, *larvæ* and *pupa* (1881).

HABITAT : Ceylon.

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* *Loxura cassiopeia*, Distant, Ann. and Mag. of Nat. Hist., fifth series, vol. xiv, p. 200 (1884) ; idem, id., Rhop. Malay., p. 282, n. 2, figs. 88, *male* ; 89, *female* (1885). HABITAT : Perak. EXPANSE : *Male* and *female*, 1·6 incbes. DESCRIPTION : " MALE. UPPERSIDE, *both wings* dark reddish-ochraceous. *Forewing* with the costal margin (as far as the subcostal nervure) and the outer margin (broadest at the apex) fuscous or black, tbe base tinged with olivaceous-brown. *Hindwing* with the outer margin fuscous (darkest at the apex), the *cilia* ochraceous, the base and abdominal area more or less olivaceous-brown, *tail* ochraceous, witb an obscure medial reddish line, and the apex whitish. UNDERSIDE, *both wings* bright ochraceous, with the following brownish spots :—*forewing* with one about the middle of the cell, three disco-cellular and contiguous at the end of the cell, and beyond these are two separated by the second subcostal nervule ; a waved macular discal band, and a submarginal series of very small and somewbat obsolete spots. *Hindwing* with some obscure basal spots, a macular band crossing tbe disc, but not extending below the first median nervule, and a submarginal series of small obscure spots as on the forewing. *Body* above fuscous, beneath greyish ; *legs* and *palpi* blackish, speckled with greyish. FEMALE. UPPERSIDE, *both wings* resembling the male. *Hindwing* shaded with fuscous, which is darkest on the costal and outer margins." UNDERSIDE, *both wings* as in the male.

" The nearest ally of this species is the *L. prabha*, Moore, from the Andaman Isles." (*Distant*, l. c. in Rhop. Malay.)

The type specimens of this species are contained in the Indian Museum, Calcutta. The species is nearer I think to *L. surya*, Moore, than it is to *L. prabha*, as the costal margin of the forewing on the upperside is broadly black as in that species. I cannot distinguish it from *L surya* on the upperside, but it is much paler on the underside, of a different shade of yellow (paler, more gamboge-like), and all the markings more macular than in the South Indiau form.

EXPANSE : ♂, 1·4 ; ♀, 1·5 inches.

DESCRIPTION : "MALE. UPPERSIDE, *both wings* bright fulvous. *Forewing* with a blackish pical marginal band, curving from the middle of the costa to the posterior angle. *Hindwing* with a very slender indistinct blackish marginal band ; abdominal margin and anal lobe, and *tail*, yellowish or brownish-fulvous. UNDERSIDE, *both wings* yellowish-ochreous, crossed by two outer very indistinct narrow lunular bands. FEMALE. UPPERSIDE, *both wings* with broader marginal bands ; basal areas, abdominal margin and *tail* more dusky than in the male." UNDERSIDE, *both wings* as in the male. "*Palpi* and *legs* white, speckled with black."

"An intermediate species, nearer to *L. prabha*, Moore, than to *L. atymnus*, Cramer."

"LARVA slender, limaciform, anterior segments thickened, head small ; green, with two dorsal white-striped marks. Feeds on *Smilax*. PUPA green ; thorax oblique in front, anal segments attenuated." (*Moore*, l. c.)

This species is variable, though perhaps not to the extent shewn by *L. atymnus* and *L. prabha*. It occurs commonly throughout Ceylon.

Genus 165.—YASODA, nov. Doherty, MS. (PLATE XXIX).

Superficially resembling *Loxura*, Horsfield. FOREWING, with the *costa* highly arched, slightly indented at the base, *apex* acuminate, *outer margin* very slightly concave to first median nervule and outwardly oblique, then convex and inwardly oblique (straight in the female) to inner angle, *inner angle* rounded, *inner margin* straight ; costal and subcostal nervures lying far apart except at the base ; *costal nervure* reaching to opposite the apex of the discoidal cell ; bases of the *first* and *second subcostal* and *upper discoidal nervules* equidistant ; *middle* and *lower disco-cellular* nervules of about equal length, concave, slightly inwardly oblique ; *discoidal cell* short, not reaching to the middle of the wing, broad ; *median nervules* lying close together, *second median* nervule with its origin a little before the lower end of the cell ; *submedian interspace* broad ; *submedian nervure* straight. HINDWING, with the *costa* arched at base, then straight to apex ; *apex* rounded, *outer margin* straight to base of tail, then at right angles to its former course and straight to anal angle ; a very small *anal lobe*, above which the *abdominal margin* is somewhat shallowly excavated ; a long broad curled *tail* from the first median nervule, the vein running half way down the tail ; *costal nervure* slightly arched at the base of the wing, afterwards straight and reaching the apex of the wing ; *first subcostal nervule* given off rather near to the apex of the cell ; *disco-cellular* nervules of about equal length, concave, outwardly oblique ; *second median* nervule with its origin immediately before the lower end of the cell ; *submedian* and *internal nervures* straight. MALE with an elongated patch of scales differently formed to those on the rest of the wing occupying the middle two-thirds of the first median nervule (excluding that portion of the vein which traverses the tail). BODY small, short ; *palpi* very long, porrect, longer in the female than in the male ; *antennæ* very short, about one-third of the length of the costa of the forewing, with no distinct club ; *eyes* smooth. Type, *Loxura pita*, Horsfield.

"This genus is in many respects intermediate between *Loxura*, Horsfield, and *Eooxylides*, de Nicéville. From the former it is easily distinguished by the absence of the fourth subcostal nervule, from the latter by having only one tail instead of three. The last joint of the palpi which in *Eooxylides* is rather slender, flattened and tapering (though not so long as in *Loxura*), is in *Yasoda* shorter (less than one-half of the preceding), broad, flat, and elliptical. *Yasoda* has the sex-mark between the submedian nervure and first median nervule of the forewing. *Loxura* has no sex-mark." (*Doherty*, MS.)

Yasoda is a very remarkable and distinct genus. Superficially it resembles *Loxura*, Horsfield, in which genus the species now placed in *Yasoda* have hitherto been included. The coloration is much the same in both, the upperside being orange, with a more or less broad outer black margin. The body, antennæ, palpi, long tail, and small anal lobe to the hindwing are also the same in both, but the outline of the wings is very different ; the forewing in *Yasoda*

has two subcostal nervules instead of three, and the male has a very remarkable and unique "sexual mark" on the hindwing not found in *Loxura*. *Yasoda*, as far as I am aware, occurs only in North-East India (Sikkim and Assam), the Malay Peninsula, the Nicobars, and in Java, and is represented by two closely-allied species only.

981. **Yasoda tripunctata**, Hewitson. (PLATE XXIX, FIGS. 233 and 234 ♀).

Loxura tripunctata, Hewitson, Ill. Diurn. Lep., p. 26, n. 4 (1863); *Myrina pita*, Doubleday and Hewitson (*nec* Horsfield), Gen. Diurn. Lep., vol. ii, pl. lxxiv, fig. 2, *male* (1852); *Loxura pita* (part), Westwood, l. c., p. 475, n. 2.

HABITAT: Sikkim, Assam, Burma, Perak.

EXPANSE: ♂, 1·3 to 1·5; ♀, 1·4 to 1·5 inches.

DESCRIPTION: MALE. UPPERSIDE, *both wings* usually deep orange, sometimes fulvous. *Forewing* with the costa usually narrowly but increasingly black, the apex broadly and the outer margin somewhat broadly black, the inner edge of this black portion evenly rounded, the disco-cellular nervules usually marked with a black line, three somewhat rounded black spots on the disc divided by the first and second median nervules, in some specimens from Sikkim there are only two of these black spots, divided by the second median nervule; the base of the wing dusky. *Hindwing* with the costal and outer margins usually somewhat broadly black, the abdominal margin usually more broadly black, the disco-cellular nervules marked with a black line, a broad discal irregular band at right angles to the body across the disc of the wing joining the black abdominal and outer margins, sometimes much narrower and not reaching the narrow outer black margin. UNDERSIDE, *both wings* yellow, shaded with brownish in the anal region of the hindwing. *Forewing* with two subbasal series of black-outlined spots, three discal series of similar spots but filled in with pale brown, placed in echelon, the upper series consisting of two spots near the costa, the middle series below of three spots, the lower series of four spots. *Hindwing* with subbasal spots as in the forewing, a discal catenulated band filled in with pale brown, two indistinct marginal series of connected lunules, some whitish black-outlined marks above the anal lobe. *Tail* throughout blackish, tipped with white. FEMALE marked similarly to the male, but all the markings usually broader.

The male can at once be distinguished on the upperside by the hindwing being longitudinally folded in the neighbourhood of the "sexual mark," the latter marked inwardly by a rather conspicuous narrow long orange line. *Y. tripunctata* is a rare species; it occurs in Sikkim in April and October. Mr. Wood-Mason obtained four specimens in Cachar in May and July, and Mr. J. L. Sherwill has sent me a single female from Jorehât, Assam, taken in June. Professor Westwood records it from Sylhet. Both sexes show much diversity in the prominence or otherwise of the black markings on the upperside. Judging from analogy I think it will be found that the lighter-coloured specimens will be observed on the wing in the dry-season. This latter form is the one figured by Hewitson in the "Genera of Diurnal Lepidoptera." On one side he has given two black spots on the forewing in the submedian interspace; this is either an error, or an individual peculiarity of the example figured.

Figure 233 shews both sides of a female example from Sikkim, figure 234 shews both sides of a female specimen from Jorehât in Assam, both in my collection. These figures exhibit to some extent the variability in the extent of the black markings on the upperside which obtains in this species.

I append a description of the only other known species in the genus, *Y. pita*, Horsfield.*

* *Yasoda pita*, Horsfield. *Loxura pita*, Horsfield, Cat. Lep. E. I. C., p. 122, n. 50 (1829). HABITAT: Java. EXPANSE: *Female*, 1·25 inches. DESCRIPTION: "FEMALE. UPPERSIDE, *both wings* fulvous, the tint being saturated and inclining to orange. *Forewing* with the exterior and apical borders blackish brown, meeting the orange portion in a regularly arched boundary line, extending from the middle of the anterior costa to the inner apical angle. *Hindwing* with the apical border and an oblique band composed of four contiguous spots extending from the outer apical angle to the middle of the inner margin, of the same colour; anal termination of the apical border diffuse and evanescent internally and marked with a few obsolete white dashes; inner margin excavated to receive the abdomen, gray. UNDERSIDE, *both wings* ochraceous-yellow, uniformly

Mr. W. Doherty has given me notes of a species of *Yasoda* which he took on Larut Hill, Perak, Malay Peninsula, between 3,000 and 5,000 feet. The male agrees with *Y. pita*, Horsfield, in having no black spots on the upperside of the forewing on the disc, but the female has "a small dusky spot usually present on the disc, on both sides of the first median nervule." (*Doherty*, MS.) These specimens would appear to be about exactly intermediate between *Y. tripunctata* and *Y. pita*, the male resembling the latter, the female the former. He describes the organs of generation in the males of these specimens as follows :—"PREHENSORES, *Uncus* seen from above broad, with parallel sides, bifid, incised by two entering straight lines meeting at a right angle, the two apices rather acute. Seen from the side it is narrow, rounded and projecting at its lower angle. Branches long, bent first forwards (towards the body), then inwards (towards each other), then backwards, the end straight, slender and acute. *Clasps* tapering slightly, the tip enlarged, truncate and dentate on its upperside. *Intromittent organ* enlarged and obliquely truncate at the tip, a short corneous spine diverging from its lower side near the end." This is the first time any species of this genus has been recorded from the Malay Peninsula. Mr. Doherty also informs me that "on the island of Little Nicobar I captured a single female butterfly apparently of this genus, and not uncommon there." He took *Y. tripunctata* also at Mergui, Burma, in the cold weather.

The tenth division that I have made in the Indian *Lycænidæ* I have called the *Deudorix* group. It contains ten Indian and one Malay Peninsula genus. It shares with the *Loxura* group which precedes it the feature of possessing only one tail to the hindwing variable in length. The hindwing is elongated and produced posteriorly, with a well-formed anal lobe in all the genera except *Drina*, mihi. The forewing in all the genera (except the genus *Sithon*, Hübner, which has two only, and has not so far been recorded from the strict Indian limits of this work), has three subcostal nervules in both sexes. The group may be divided into two subgroups, the first without, the second with secondary sexual characters in the males on the wings.

The first genus, *Drina*, mihi, contain three species, one occurs in Burma and the Malay Peninsula, the second in the Malay Peninsula only, and the third appears to be confined to the Philippine Islands. In this genus the anal lobe to the hindwing is very small, the tail is rather broad, not filamentous, about a quarter of an inch in length ; all the species are silvery-white on the underside, as in the genus *Curetis*, Hübner ; both sexes of one species are black on the upperside, with a double submarginal series of white spots to the hindwing, the males of the other two species are more or less blue above.

The next two genera, *Lehera*, Moore, and *Araotes*, Doherty, MS., have the anal lobe to the hindwing large, the tail filiform in the male, much longer and highly ciliated or "fluffy" in the female. At present but few species are known to occur in both genera. The females of all of them are fuscous on the upperside of both wings, with a large white patch in the anal region in the hindwing. The first genus, *Lehera*, Moore, contains two species only, the male of one of them is rich dark purplish-blue on the upperside, on the underside one species is verdigris-green, the other clear-yellow. In the forewing the first subcostal nervule is quite free from the costal nervure, in *Araotes* they touch for a short distance. *Lehera* occurs in the Eastern Himalayas, Assam, Burma, and China. The genus *Araotes* contains at present but a single

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covered with an opaque pulverulent tint ; medial portion of the surface marked with numerous very minute and obsolete brown arcs, which in the *hindwing* are arranged in two parallel interrupted strigæ, the posterior one increasing in distinctness towards the inner margin, where it bears externally a lunular white cloud ; extreme anal margin bearing an irregularly diffuse brown stripe terminating in a distinct ocellate spot on the anal appendage ; the latter surrounded internally by a white lunule from which an obscure striga passes over the extreme anal region. *Tail* ferruginous-brown, tipped with white. *Body* brown above, pale yellowish underneath. *Legs* whitish, marked with numerous well-defined black bands, which are more crowded on the tarsi." (*Horsfield*, l. c.)

The female of this species may be known from both sexes of *Y. tripunctata*, Hewitson, by the absence of all black markings on the disc of the forewing on the upperside. The male is said by Hewitson to be without spots on either wing on the upperside.

species, which has a very wide range, being found in Sikkim, the Chittagong Hill Tracts, Burma, the Malay Peninsula, and Borneo. *A. lapithis*, Moore, is a very small but beautiful species, the male more or less blue on the upperside, richly coloured and marked on the underside.

The genus *Sithon*, Hübner, which occurs in the Malay Peninsula and Archipelago, is highly aberrant, as it has only two subcostal nervules to the forewing, and the male has a tuft of hairs attached to the inner margin of that wing and turned under and forwards. The male of the type species, *S. nedymond*, Cramer, is of the richest and most glorious blue on the upperside, having but few rivals in this respect. The underside is marked somewhat as in *Tajuria jalindra*, Horsfield, and allies, and *Charana mandarinus*, Hewitson.

The next two genera, *Deudorix*, Hewitson, and *Zinaspa*, mihi, have the anal lobe to the hindwing large, and the tail in both sexes short and filamentous. The first genus is probably monotypic, the male is red on the upperside, the margins black, the female is fuliginous above. *D. epijarbas*, Moore, has a wide range in the Indo-Malayan region, occurring almost everywhere. The second genus, *Zinaspa*, mihi, contains but two species, which are very closely allied, and are found in Sikkim, Assam, Burma, and Southern India only. Both sexes are blue or purple on the upperside, dull brown inconspicuously marked on the underside.

In the second subgroup of the *Deudorix* group all the genera possess secondary sexual characters on the wings in the male, the hindwing invariably bearing a round depressed or cup-like space on the upperside of the hindwing below the costa, which is correspondingly raised on the underside. This peculiar "male-mark" is strictly confined to this subgroup of genera. The subgroup may again be split up ; the first genus, *Hysudra*, Moore, not possessing a tuft of hairs on the forewing near the base of the inner margin turned under and forwards, this being found in all the other genera. *Hysudra* contains but a single species, which is confined to the Western Himalayas. Both sexes are fuscous on the upperside, the forewing with a discal, the hindwing with a marginal orange patch.

The next genus, *Rapala*, Moore, is a very large one, and appears to be strictly confined to the Indo-Malayan region. The tail to the hindwing is short and filamentous, as it is also in the genera *Virachola* and *Sinthusa*, Moore, which follow. These three genera can be distinguished in the male by the size and position of the "scale-mark" on the hindwing ; in *Rapala* it does not extend into the discoidal cell, in *Virachola* and *Sinthusa* it does so. The species of *Rapala* are either blue, purple, or red on the upperside, often very richly glossed with a different shade of blue or purple in some lights.

The genus *Bindahara*, Moore, contains four species, which are confined to the Indo-Malayan region. They are all remarkable butterflies ; the hindwing is furnished with a very long tail which is highly ciliated and broad at its base, ochreous in the male, white in the female. The male is very deep velvety black on the upperside, and two species have a patch of blue on the outer margin of the hindwing. The females are smoky-black on the upperside, with a large patch of white towards the anal angle of the hindwing.

The next two genera of the group are *Virachola* and *Sinthusa* of Moore ; they have the tail short and filamentous. *Virachola* contains up to the present three species only, which occur in India, Ceylon, and the Andaman Isles. The markings of all of them are very similar to those of *Deudorix epijarbas*, Moore, and like that species the larvæ of two of them feed on different fruits. They are all more or less blue or purple on the upperside. They are of rather large size.

The last genus of the group, *Sinthusa*, Moore, may be known by the butterflies being of much smaller size than in *Virachola*, Moore, and in the forewing the middle disco cellular nervule arises a little beyond the base of the upper discoidal cell instead of exactly at the base of that vein as in that genus. The males are always more or less blue on the upperside, the females are smoky black, with no blue coloration, sometimes with a discal orange or ochreous-white patch on the forewing, the hindwing usually more or less white towards the anal angle. The genus occurs in the Himalayas, Assam, Burma, the Malay Peninsula, and in Sumatra and Java.

Genus 166.—DRINA, nov. (Plate XXIX).

Forewing, *costa* somewhat strongly and regularly arched, *apex* acute, *outer margin* slightly concave, *inner* margin slightly sinuous ; *costal nervure* ending on the margin considerably beyond the apex of the discoidal cell ; *second subcostal nervule* with its base equi-distant between the bases of the first subcostal and upper discoidal nervules ; *third* subcostal long, originating about midway between the apices of the cell and of the wing ; terminal portion of *subcostal nervure* reaching the extreme apex of the wing ; *upper discoidal nervule* originating immediately before the apex of the cell ; *middle* and *lower disco-cellular* nervules upright, slightly concave, the lower a little the longer ; *second median* nervule originating some distance before the lower end of the cell ; *submedian nervure* nearly straight. Hindwing, *costa* arched, *apex* rounded, *outer* margin nearly straight to the base of the tail, then at right-angles to anal angle, *abdominal* margin recurved ; *costal nervure* curved throughout its length ; *first subcostal nervule* originating far before the apex of the cell ; *upper disco-cellular* nervule straight, outwardly oblique ; *lower* disco-cellular concave, upright, a little longer than the upper ; *second median* nervule originating a little before the lower end of the cell ; *submedian nervure* straight ; *internal* nervure rather long, recurved. *Antennæ* short, much less than half the length of the costa of the forewing, with a gradually-formed, rather long, slender club. *Eyes* naked. *Palpi* porrect, reaching to about the middle of the eyes, clothed with adpressed close scales. *Body* moderately robust. *Tail* rather short, less than one-third of an inch in length, rather broad, placed at the termination of the first median nervule. Type, *Myrina donina*, Hewitson.

Drina is perhaps nearest to *Cheritra*, Moore, from which it may at once be known by the much shorter single tail to the hindwing, the absence of an anal lobe, the disco-cellular nervules more upright ; in the forewing by the costal nervure being much longer ; the palpi are also much shorter. My knowledge of the genus is derived from a single female specimen of the type species, which is so unusual in appearance on both surfaces, and moreover so very different in structure from its apparently nearest ally, that I have no doubt that it constitutes the type of a very good genus. The genus contains possibly three species, two of which are included in this work, and occur in Burma and the Malay Peninsula, the third is the *Myrina mavortia* of Hewitson, which was described from Mindanao, one of the Philippine Isles.

982. Drina donina, Hewitson. (Plate XXIX, Fig. 235 ♀).

Myrina donina, Hewitson, Ill. Diurn. Lep., p. 39, n. 41, pl. xvii, figs. 61, 62, *female* (June, 1865) ; *Myrina (Purlisa ?) donina*, Doherty, Journ. A. S. B., vol. lv, pt. 2, p. 260, n. 12 (1886) ; *Myrina usita*, Felder, Reise Novara, Lep., vol. ii, p. 238, n. 268, pl. xxx, figs. 5, 6, *male* (Oct., 1865).

Habitat : Burma (*Hewitson*) ; Sirtai Mountain, Lushai country, near the frontier of the Chittagong Hill Tracts ; Mergui ; Myitta (*Doherty*) ; Malacca interior (*Felder*).

Expanse : ♂, 1·8 ; ♀, 1·9 to 2·2 inches.

Description : "Male. Upperside, *both wings* fuscous. *Hindwing* ciliated with dull whitish, the external border darker, adorned with two series of whitish spots, the inner one bent, the outer one incomplete. Underside, *both wings* silky whitish, a blackish-fuscous line before the cilia, a striga beyond the disc, straight in the forewing, wavy in the hindwing, another external broader, marked on the hindwing with a black subanal spot, and a third obsolete before the margin, hoary-fuscescent. *Forewing* with the internal border hoary-fuscescent. *Hindwing* with a black anal spot circled with hoary and fuscous."

"This not less remarkable insect belongs, as does the preceding [*Myrina discophora*, Felder, from the Philippines] to the neighbourhood of *M. maneia*, Hewitson" [see foot-note, p. 443]. (*Felder*, l. c.)

"Female. Upperside, *both wings* dark brown, paler towards the base. *Hindwing* crossed beyond the middle by two bands of white spots. *Cilia* rufous-white. Underside, *both wings* glossy white, crossed beyond the middle by two indistinct pale rufous bands.

Hindwing with a small black spot at an unusua distance from the base of the tail, the outer margin rufous."

"This is a species of peculiar interest, and unlike anything we have yet seen. I place it here with some doubt. In its form and the colouring of the underside it resembles *Anops*" [= *Curetis*, Hübner]. (*Hewitson*, l. c.)

I have no doubt that Hewitson and Felder described, within a few months of each other, opposite sexes of one species as two distinct species, though Hewitson says that the *Myrina usira* of Felder is " very near to *M. donina*, but differs from it, according to Felder's figure, in the arrangement of the inner band on the underside of the forewing." (Ill. Diurn. Lep., Suppl. p. 4, n. 49 (1869). There is a slight difference certainly, but I think it is due to the rough drawing of Felder's figure. The male and female are very nearly alike, the former is rather smaller, the wings less broad, the double series of white spots near the outer margin of the hindwing on the upperside about half as large. Mr. W. Doherty obtained this species in the Chittagong Hill Tracts, Major C. T. Bingham captured a single female specimen in the Donat Range, Upper Tenasserim in January, Mr. Hewitson recorded it from Burma, and Dr. Felder from Malacca interior. It is not included in Mr. Distant's "Rhopalocera Malayana."

The figure shews both sides of the female specimen from the Donat Range, Upper Tenasserim, in my collection.

An apparently allied species has been described as below* from Singapore. It differs in coloration in the male very considerably from *D. donina*, Hewitson, as the basal two-thirds of the forewing on the upperside is brilliant blue, which colour is absent in the female, in which sex the two species would be more nearly alike.

Genus 167.—LEHERA, Moore. (PLATE XXIX).

Lehera, Moore, Proc. Zool. Soc. Lond., 1883, p. 528; *Artipe* (preoc.), Boisduval, Lép. Guat., p. 14 (1870).

"MALE. *Wings* large, broad. FOREWING, triangular, *first subcostal nervule* emitted at nearly half before the end of the cell, *second* at one-fourth, *third* bifid and emitted from near the end of the cell, *fourth* at half from below the third and terminating at the apex, *fifth* from the end of the cell ; *disco-cellular* nervules slightly recurved, *discoidal* nervule from the middle ; *second median* nervule at one-fifth before the end of the cell, *first* median at one-third before the end ; *submedian nervure* recurved ; no tuft on the posterior margin. HINDWING, broadly ovate ; *exterior margin* slightly sinuous below the apex ; anal lobe large ; furnished with a single long slender *tail* ; no costal glandular patch ; *costal nervure* much arched and terminating at the apex ; *first subcostal nervule* emitted at one-third before the end of the cell ; *disco-cellular* nervules oblique, *discoidal* nervule from the middle ; *second median* nervule emitted at one-eighth before the end of the cell ; *first* median at nearly one-half before the end ; *submedian nervure* straight ; *internal* nervure recurved. *Body* very robust ; *antennæ* with a long thickened club. Type, *L. eryx*, Linnæus." (*Moore*, l. c.)

In the forewing of the male the outer margin is very straight and oblique, the second subcostal nervule originates nearer to the base of the first than to the base of the upper discoidal, the third subcostal nervule is given off from the costal nervure about midway between the

* *Drina maneia*, Hewilson. *Myrina maneia*, Hewitson, Ill. Diurn. Lep., p. 29, n. 6, pl. xii, figs. 14, 15, *male* (1863). HABITAT: Singapore. EXPANSE: *Male* and *female*, 1·55 inches. DESCRIPTION: "MALE. UPPERSIDE, *both wings* dark brown. *Forewing* brilliant blue from the base to beyond the middle. *Hindwing* with one tail, the anal angle and a marginal line black ; a [subanal] band of four spots, two caudal spots (one touching the margin), the *tail*, and the *cilia*, white. UNDERSIDE, *both wings* white. *Forewing* with its outer half rufous, marked at the anal angle by two white spots, and bordered inwardly by darker colour, forming a transverse band across the wing. *Hindwing* with a short rufous band at the apex ; the outer margin, two spots near it (one on each side of the tail), a band above them, and a spot above the band, all black. FEMALE does not differ from the male, except that it is without the blue colour on the UPPERSIDE of the *forewing*." (*Hewitson*, l. c.)

This species is not included in Mr. Distant's "Rhopalocera Malayana." I place it a little doubtfully in this genus, though it has many points in common with the type species, the shape of the wings is much the same, the tail is the same, both species have white spots on a blackish ground on the upperside of the hindwing, and the ground-colour of the underside is the same. Both species appear to lack secondary sexual characters in the male. I have seen no specimen of it.

apices of the cell and of the wing, and is rather short, not nearly reaching the apex of the wing, the middle disco-cellular nervule originates from the upper discoidal quite close to its origin, and is about one-third shorter than the lower disco-cellular, both are slightly concave and upright, the second median nervule arises some little distance before the lower end of the cell. In the hindwing the disco-cellular nervules are concave, of equal length, and together form a very obtuse angle, the second median nervule originating immediately before the lower end of the cell, the internal nervure strongly recurved, tail moderately long, very slightly ciliated. Male without secondary sexual characters. In the female the wings are broader, the forewing has the outer margin regularly convex, the hindwing has the tail fully four times as long as in the male and very fluffy, being heavily ciliated on both edges. The eyes are hairy. The neuration of *Lehera* is very much as in typical *Deudorix*, Hewitson, but the very different *facies*, and the length of the tail in the female are sufficient to keep *Lehera* distinct.

The genus contains but two known species, one of which is represented by a unique example. The male of *L. eryx*, Linnæus, is brilliantly glossed with rich dark purplish-blue on the upperside, the anal lobe is green, as is also the underside throughout except an inconspicuous discal series of white spots, the anal lobe of the hindwing is black, the tail black tipped with white. The female is very much larger than the male, the upperside shining fuscous, the hindwing with the outer anal third pure white enclosing some marginal black spots between the veins, the cilia and tail entirely white, the latter very long. *L. skinneri*, Wood-Mason and de Nicéville, differs only in having all the green coloration replaced by clear ochreous. It occurs in Cachar, while *L. eryx* is found in Sikkim, Assam, Burma, and has been recorded from China.

Key to the species of Lehera.

A. Underside emerald-green.
  983. L. ERYX, Sikkim, Assam, Burma, China.
B. Underside clear ochreous.
  984. L. SKINNERI, Cachar.

983. Lehera eryx, Linnæus. (PLATE XXIX, FIG. 236 ♂).

Papilio eryx, Linnæus, Mant. Plant., p. 537 (1771); id., Fabricius, Syst. Ent., p. 522, n. 336 (1775); *Deudorix eryx*, Butler, Cat. Fab. Lep. B. M., p. 180, n. 1 (1869); id., Staudinger, Ex. Schmett., p. 279, pl. xcvi, *female* (1888); *Lehera eryx*, Moore, Proc. Zool. Soc. Lond., 1883, p. 529; *Papilio amyntor*, Herbst, Pap., vol. xi, p. 27, n. 79, pl. ccc, figs 5, 6, *female* (1804); *Deudorix amyntor*, Hewitson, Ill. Diurn. Lep., p. 17, n. 1, pl. viii, figs. 19, 20, *male* (1863).

HABITAT: Sikkim, Assam, Burma, China.

EXPANSE: ♂, 1·4 to 1·8; ♀, 1·9 to 2·4 inches.

DESCRIPTION: MALE. UPPERSIDE, *both wings* black. *Forewing* with the basal two-thirds glossed with rich steely purplish-blue, gradually merging into the black ground-colour, not sharply-limited. *Cilia* black. *Hindwing* almost entirely glossed with the same shade of purple, the costal and abdominal margins alone free, the latter somewhat pale fuscous, and thickly clothed with long fur-like modified scales; the anal lobe emerald green, extending narrowly up the abdominal margin; the *tail* black tipped with white. *Cilia* cinereous. UNDERSIDE, *both wings* uniformly emerald green. *Forewing* with the inner margin paler, a very indistinct greenish-white somewhat macular discal band not reaching the costa. *Hindwing* with a macular whitish irregular discal band, the anal lobe centred with deep black, two indistinct submarginal irrorated black spots beyond, a whitish anteciliary fine line towards the anal angle. FEMALE. UPPERSIDE, *both wings* shining fuscous. *Hindwing* with the outer anal third of the wing from the abdominal margin decreasingly to the discoidal interspace pure white, its inner edge very irregular, the black area extending into the white portion anteriorly and marginally as far as the second median nervule, posterior to which are two large oval black spots, the large anal lobe centred with green, the *tail* long, pure white and strongly ciliated, the abdominal margin pale fuscous. *Cilia* long, pure white, becoming fuscous towards the apex of the wing. UNDERSIDE, *both wings* green as in the male.

Forewing with the macular discal fascia more prominent. *Hindwing* with the discal fascia more prominent also, the outer anal third of the wing white, bearing a series of green spots, commencing with a linear one from the abdominal margin, then a very large round one in the submedian interspace centred with black and white, a rather smaller round spot in the first median interspace with a medial black spot crowned with white, above which are two lunular spots with a green lunular line within, a fine green anteciliary line, anal lobe black.

The green colouring of the underside of this species is unique as far as I know amongst Indian butterflies, but is paralleled by the European "Green Hairstreak," *Thecla rubi*, Linnæus. It must be an efficient protection for the insects when at rest with closed wings on the surfaces of leaves, but it is strange that in the female it is apparently rendered less protective than in the male by the large patch of white towards the anal angle of the hindwing. *L. eryx* is, I believe, a rare species wherever it occurs. I have received both sexes from the Khasi Hills obtained by the Rev. Walter A. Hamilton; one female from Sibsagar, Upper Assam, taken by Mr. S. E. Peal; and several specimens from Rangoon taken in September by Mr. B. Noble.

The figure shews both sides of a male specimen from the Khasi Hills in my collection.

984. **Lehera skinneri**, W.-M and de N.

L. skinneri, Wood-Mason and de Nicéville, Journ. A. S. B., vol. lv, pt. 2, p. 369, n. 138, pl. xv, fig. 3 *female* (1886).

HABITAT: Cachar.

EXPANSE: ♀, 1·8 inches.

DESCRIPTION: "FEMALE. UPPERSIDE differs only from the same sex of *L. eryx*, Linnæus, in the anal lobe of the *hindwing* being centred with clear ochreous instead of emerald-green. UNDERSIDE differs only from that species in having the ground-colour clear ochreous also instead of emerald-green." (*Wood-Mason* and *de Nicéville*, l. c.)

The single female obtained by Mr. Wood-Mason at Irangmara, Cachar, on 21st July, 1881, remains unique in the collection of the Indian Museum, Calcutta. It differs only from *L. eryx* in the green colour being replaced by yellow, which may be due to an accident or to extraneous agency, chemical or otherwise.

Genus 168.—ARAOTES, Doherty, MS., nov. (PLATE XXIX).

FOREWING, *costa* gently curved, *apex* rounded, *outer margin* slightly convex, *inner* margin straight; *costal nervure* sinuous, terminating on the margin about opposite to the apex of the discoidal cell; *first subcostal nervule* emitted at two-thirds of the length of the cell from the base, bent upwards soon after its origin and almost touching the costal nervure for a short distance; *second* subcostal with its base nearer to the base of the first subcostal than to the base of the upper discoidal; *third* subcostal emitted about midway between the apices of the cell and of the wing, lying very close to the subcostal nervure; *disco-cellular* nervules upright, slightly concave, the middle rather shorter than the lower; *second median* nervule given off a short distance before the lower end of the cell. HINDWING, *costa* evenly curved, *outer margin* very straight to the apex of the second median nervule, where it is toothed or angled; a somewhat long narrow *tail* at the termination of the first median nervule, rather longer in the female than in the male; a prominent elongated narrow *anal lobe*; *disco-cellular nervules* very straight, of equal length, and outwardly strongly oblique; *second median* nervule given off some little distance before the lower end of the cell. *Eyes* hairy. Male with no secondary sexual characters. Type, *Myrina lapithis*, Moore.

I cannot say that *Araotes* is nearly related to *Biduanda*, Distant, in which genus Mr. Distant places the type species of *Araotes*, as the neural characters differ very largely; and besides in the typical species, *B. thesmia*, Hewitson, the hindwing has three tails instead of one, a long middle one from the termination of the first median nervule, one half as long from the submedian nervure, and one from the second median nervule the shortest of all, in addition to a small anal lobe. Mr. Distant places two species only in the genus *Biduanda*, but I am

obliged to remove one of them for the reasons above given, and to make it the type of a new genus.

A. lapithis, Moore, is a small but very beautiful species. The male has the hindwing on the upperside entirely rich blue, the basal half of the forewing is also blue but of a deeper shade and hardly to be seen except in certain lights. The underside is ochreous-rufous marked across the disc with a broad white band, which covers the whole of the base of the hindwing, and bears numerous black markings scattered over it, with some metallic green ones at the anal angle. The female is plain fuscous on the upperside, with a broad patch of white on the lower third of the hindwing. *A. lapithis* has a wide range, and occurs in Sikkim, the Chittagong district, and from Burma to Singapore, and again in Java and Borneo, but appears to be nowhere common. Mr. Doherty informs me that he has taken "two or perhaps three species of *Araotes* in the Malay Peninsula," which are as yet undescribed.

985. **Araotes lapithis**, Moore. (Plate XXIX, Fig. 237 ♂).

Myrina lapithis, Moore, Horsfield and Moore, Cat. Lep. Mus. E. I. C., vol. i, p. 48, n. 79 (1857); i . Hewitson, Ill. Diurn. Lep., p. 36, n. 32, pl. xv, figs. 35, 36, *male*; 37, 38, *female* (1863); id., Butler, Trans Linn. Soc. Lond., Zoology, second series, vol. i, p. 549, n. 5 (1877); *Sithon lapithis*, Druce, Proc. Zool. Soc. Lond., 1873, p. 351, n. 7; *Biduanda lapithis*, Distant, Rhop. Malay., p. 238, n. 2, pl. xx, fig. 29, *female* (1884); id., Moore, Journ. Linn. Soc. Lond., Zoology, vol. xxi, p. 42 (1886); id., Doherty, Journ, A. S. B., vol. lv, pt. 2, p. 260, n. 13 (1886).

Habitat: Sikkim, Chittagong Hill Tracts, Burma, Malay Peninsula, Java, Borneo.

Expanse: ♂, ♀, ·90 to 1·25 inches.

Description: Female. "Upperside, *both wings* glossy-brown. *Hindwing*, anal area, *tail*, and *cilia*, white, with a patch of light glistening blue at the anal angle and between the median nervules. Underside, *forewing* chrome-yellow, darker on the anterior half; a white fascia from the middle of the anterior margin, spreading widely across to the posterior margin, and bordered by blackish; three separate blackish short lines across the anterior half of the wing. *Hindwing* white, extreme base and anterior angle yellow, at the base and in the middle of the wing are disposed several spots and short lines of black, anal angle black, a black spot at the angle on the exterior margin, these being bounded anteriorly with metallic silvery-green, and then yellow." (*Moore*, l. c. in Cat. Lep. Mus. E. I. C.)

"Male. Upperside, *forewing* dark brown [black]. *Hindwing* brilliant blue, with one tail. Underside, *forewing* rufous, crossed transversely before the middle by a band of white, bordered on both sides with dark brown, a transverse line of the same colour beyond the middle. *Hindwing* silvery white, with several black spots; the apex broadly rufous; the caudal spot, a spot outside of it, the lobe, a spot between them, and a spot above them irrorated with silvery blue; the outer margin black, traversed by a line of white; the *tail* [and anal lobe] black. Female. Upperside, *both wings* rufous-brown. *Hindwing* with the apex [anal region] and *tail* white. Underside does not differ from the male, except that the *tail* [and anal lobe] are white."

"On the underside this species varies considerably in the form of the line which crosses the forewing beyond the middle, as well as in the size of the black spots of the hindwing." (*Hewitson*, l. c.)

I possess a single male of this species from the collection of the late Mr. L. Mandelli, taken in Sikkim, and another male taken in June in Rangoon. There is a single female in the Indian Museum, Calcutta, taken by Dr. J. Anderson at Yimiki, King Island, Mergui Archipelago, in February; which are all the specimens I have seen. Mr. Distant's figure of this species is incorrect in showing a tail at the anal angle of the hindwing instead of a lobe. *Sithon chitra*, Horsfield, is remarkably like *A. lapithis* on both surfaces, but on the underside of the forewing there is no transverse white band, and on the hindwing the discal black spots are less numerous.

Mr. Doherty describes the egg of this species as follows:—"Egg small, green, with tetragonal reticulations and short truncate spines." He also notes that the female has a pointed abdomen bearing an elongate ovipositor, and that the male prehensores are remarkable in having

the short clasps soldered to the long intromittent organ. He found the species scarce at Mergui and Myitta, Burma, in the cold weather ; also at Barakhal in the Chittagong Hill Tracts.

The figure shews both sides of a male specimen from Rangoon in my collection.

I give below a description of the very beautiful and highly-aberrant genus *Sithon*,* Hübner, which is found in the Malay Peninsula.

* Genus *Sithon*, Hübner, Verz. bek. Schmett., p. 77 (1816); id. (part), Moore, Proc. Zool. Soc. Lond., 1883, p. 526 ; id., Distant, Rhop. Malay., p. 253 (1885). "FOREWING, *costa* slightly arched at the base, *apex* acute, [rounded in the female], *exterior margin* very slighty convex, *posterior angle* not acute, *posterior margin* slightly convex, tufted beneath [in the male]. *Costal nervure* recurved ; *first subcostal nervule* ascending and touching the costal nervure near its end, emitted at one-third before the end of the cell, *second* at one-fifth, *third* and *fourth* from the end of the cell, no *fifth* branch ; *discoidal cell* broad ; *disco-cellular nervules* slightly concave, of equal length, *discoidal* nervule from their middle ; *second median* nervule from close to the end of the cell, *first* median at one-third before the end ; *submedian nervure* straight. HINDWING, oval ; *costa* almost angular in its middle, *apex* convex, *exterior margin* lobular near the anal angle ; *discoidal cell* short, triangular ; *first subcostal nervule* emitted at one-third before the end of the cell ; *disco-cellular* nervules oblique, recurved ; *discoidal* nervule from their middle ; *third* and *second median* nervules from the end of the cell, *first* median at one-half before the end ; *submedian nervure* straight, *internal* nervure recurved ; furnished with a longish slender *tail* from the end of the first median nervule, and a short lobate tail from the submedian nervure. Club of the *antennæ* slender ; *palpi* porrect, laxly squamose beneath, second joint extending half beyond the head, third joint slender ; *legs* squamose. Type, *S. nedymond*, Cramer," from the Malay Peninsula, Sumatra, and Java. (*Moore*, l. c.)

In the forewing of the male of the type species, the costal nervure extends to beyond the end of the cell ; there are only two subcostal nervules, Mr. Moore counting the terminal portion of the subcostal nervure and the upper discoidal nervule as additional subcostal nervules ; the middle disco-cellular nervule is distinctly shorter than the lower, both disco-cellulars are almost upright. The shape of the hindwing is peculiar, though almost exactly as in the genus *Drupadia*, Moore, but differs in the costal nervure being much longer ; the costa forming almost a right angle, of which the basal portion is the shorter side ; the disco-cellular nervules are extraordinarily outwardly oblique, more so than in any other genus known to me, the anal lobe is very long and narrow ; the antennæ are considerably more than half as long as the costa of the forewing ; the eyes are very hairy.

The type, and, as far as I know, the only species of this genus hitherto described (except its probable female *S. chitra*, Horsfield), is *S. nedymond*, Cramer. Mr. Moore, when redescribing the genus in 1883, placed in it a species which he named "*Sithon*" *indra*, thereby implying that the alied species *jalindra*, Horsfield, and *tarpina*, Hewitson, also belong to this genus. From my point of view these latter are widely separated from *Sithon* in having three instead of two subcostal nervules to the forewing, the male not furnished with a tuft of hair on the underside of the forewing attached to the inner margin, present in *S. nedymond*, and two tails instead of one to the hindwing. Overlooking the absence of one tail and a certain elongation of the hindwing, *S. nedymond* has a remarkable superficial likeness to those species, which probably led Mr. Moore to place them in that genus. In all of them the males are rich blue on the upperside, and have the underside remarkably and distinctively coloured, the base of both wings being pure white, the outer half deep brown. Such strong superficial resemblances, combined with marked structural differences, do not often occur.

With regard to the Indian *Lycænidæ* with two subcostal nervules to the forewing, this is the only genus, except *Thecla*, Fabricius, and *Yasoda*, Doherty, MS., which has one tail only to the hindwing, and in this group it is absolutely unique in being furnished in the male with a tuft of hair on the underside of the forewing.

Sithon nedymond, Cramer. *Papilio nedymond*, Cramer, Pap. Ex., vol. iv, p. 19, pl. ccxcix, figs. E, F, *male* (1780) ; *Sithon nedymond*, Hübner, Verz. bek. Schmett., p. 77, n. 776 (1816) ; id., Moore, Proc. Zool. Soc. Lond., 1883, p. 526 ; id., Staudinger, Ex. Schmett., p. 277, pl. xcv, *male* (1888) ; *Sithon nedymond*, var., Distant, Rhop. Malay., p. 253, n. 1, pl. xxii, fig. 1, *male* (1885) ; *Thecla nedymond*, Horsfield Cat. Lep. E. I. C., p. 96, n. 28 (1829). HABITAT : Coromandel Coast (*Cramer*), Java, Sumatra (*Moore*), Sungei Ujong (*Distant*), Selangor. EXPANSE : *Male*, 1·55 inches (Cramer's figure), 1·35 inches (*Distant*), 1·20 (Selangor specimen). DESCRIPTION : MALE. "UPPERSIDE, *both wings* black. *Forewing* with a deep cyaneous patch covering the whole discoidal area, broader anteriorly and gradually attenuated towards the interior margin. *Hindwing* with a broad posterior border of the same cyaneous tint, passing parallel with the margin over one-third of the entire surface, with a regularly-defined inner edge. UNDERSIDE, *both wings* white with a silvery gloss from the base to the middle. and ferruginous brown posteriorly, the boundary between the basal and apical portions being regularly transverse, extending from the middle of the costa over the disc to the anal region. *Forewing* with the apical portion almost equally divided by an undulating blackish striga, the inner portion being of a more saturated reddish-brown tint. *Hindwing* has the dark portion decreasing in breadth towards the anal region. and terminating in a curve following the outline of the wing ; a deep black streak. regularly transverse and tending to the inner margin, stands at a small distance from the anal curve, accompanied by a solitary dot at each extremity ; the anal region is either entirely ferruginous or clouded with the brown ground-colour of the apical portion of the wing, sending off two short evanescent ferruginous strigæ, parallel with the margin ; this region is likewise adorned with several irregularly-defined black marks, covered with rich greenish metallic irrorations ; the first of these is an ocellate spot, exterior of the tail near the marginal notch, bearing a broad shining lunule next follow two short opposite transverse streaks tending to the anal appendage. and finally a short narrow attenuated line, parallel with the oblique portion of the anal angle ; the posterior margin is confined by a black marginal thread, edged interiorly by a narrow white striga, which is more pronounced at the internal angle ; the surface of the anal appendage is black ; the *tail* tipt with white. *Body* black above, white underneath ; the sides of the *abdomen* being annulated. *Antennæ* delicately banded. *Legs* marked with broad alternate rings of black and white." (*Horsfield*, l. c.)

' I have only seen one specimen of this species from the Malay Peninsula, which Mr. Godfery writes me that he caught 'in a forest-path near the banks of the Linggi in Sungei Ujong.' It is evidently an extremely rare species. I have no knowledge of the female if it is not to be found in the following species ? [*S. chitra*, Horsfield.] and have treated the form here figured as a variety, owing to the transverse black streak above the anal angle on the underside of the hindwing containing some ochraceous markings not observed in typical Javan specimens." (*Distant*, l. c.)

I have seen only one small male specimen of this species from Selangor. It has the blue coloration of the upperside of a most brilliant and vivid iridescent shade.

Genus 169.—DEUDORIX, Hewitson. (Plate XXIX).

Deudorix (part), Hewitson, Ill. Diurn. Lep., p. 16 (1863); id., Moore, Lep. Cey., vol. i, p. 102 (1881); id. (part), Distant, Rhop. Malay., p. 277 (1885).

"Forewing, triangular; *apex* acute, *exterior margin* oblique, almost even, *anal angle* acute, *posterior margin* straight; *costal nervure* arched in the middle; *first subcostal nervule* emitted at two-fifths, *second* subcostal at one-fifth, and *third* subcostal immediately before the end of the discoidal cell, *fourth* subcostal at one-half from below the third and terminating at the apex, *fifth* subcostal [upper discoidal] from the end of the cell; *disco-cellular* nervules concave, angled in the middle, *lower discoidal* nervule from their angle; *discoidal cell* long, widest in the middle, *second median nervule* at one-sixth, and *first* median at two-fifths before the end of the cell; *submedian nervure* recurved. Hindwing, short, produced hindwards, *exterior margin* uneven; both sexes with a slender *tail* from the first median nervule; anal angle lobed; *costal nervure* much arched at the base; *first subcostal nervule* emitted at one-fourth before the end of the cell; *disco-cellular* nervules oblique, slender; *discoidal* nervule from their middle, *discoidal cell* short, broad at the end; *second median nervule* from very near the end of the cell, *first* median at one-third before the end; *submedian nervure* straight, *internal* nervure recurved. Body robust; *palpi* porrect, second joint projecting one-third beyond the head, attenuated at the apex, clothed with adpressed compact scales, third joint very slender, about one-fourth the length of the second in the male, longer in the female; *legs* squamose, femora slightly pilose beneath; *antennæ* long, extending beyond half the wing, club evenly-formed. Type, *D. epijarbas*, Moore." (*Moore*, l. c.)

Sithon chitra, Horsfield. *Thecla chitra*, Horsfield, Cat. Lep. E. I. C., p. 97, n. 29, pl. i, fig. 5, *female* (1829); *Myrina chitra*, Butler, Trans. Linn. Soc. Lond., Zoology, second series, vol. i, p. 549, n. 3 (1877); *Sithon chitra*, Distant, Rhop. Malay., p. 254, n. 2, pl. xxiii, fig. 15, *female* (1885). Habitat: Java (*Horsfield*), Malacca, Singapore (*Butler*), Jelebu. Expanse: *Female*, 1·8 inches (Horsfield's figure); 1·25 inches (*Distant*); 1·40 inches (Distant's figure). Description: Female: "Wings agreeing in form, longitudinal extent, and in the notch and anal appendage of the hindwing, with *S. nedymond*, Cramer. Upperside, *both wings* dark brown, with a very slight ferruginous lustre, being paler on the disc and more saturated at the borders. *Hindwing* has the anal region covered by a broad white patch, confined posteriorly by a delicate black marginal thread, and bearing two irregularly-round black spots, the exterior one being dotted with white; the anal appendage bears a black dash, attenuated interiorly and marked laterally with a greenish-silvery line; the extreme *cilia* of the hindwing and the *tail* throughout being white. Underside, *forewing* fulvous paler at the base, with an obscure yellowish litura on the disc, behind this a curved brown striga, increasing in breadth and intensity of tint towards the interior margin, and finally a black marginal thread. *Hindwing* silvery-white, with a broad fulvous posterior border attenuated towards the anal region, and continued by a narrow striga passing irregularly flexuose to the inner margin; with a very delicate linear yellowish transverse streak on the disc, a medial band of brown dots, more saturated near the costa, and continued at the inner boundary of the anal areola by a very deep black broad regularly-transverse streak, tending to the inner margin and accompanied, a little above its termination, by a solitary black dot; the anal region is interiorly bounded by a series of diversified marks of an intense black colour, disposed in a simple curve; it commences, near the outer apical angle with an oblong black streak touching a wedge-shaped streak with a minute dash of green silvery irrorations at its inner extremity; this is followed by two large irregularly-defined black spots, which also appear on the upperside the exterior one being bordered at its inner margin by a crescent of silvery irrorations, the next divided into two portions by the passage of the fulvous striga, bearing near the middle two silvery lunules opposed to each other; the series is terminated by a black streak, extending in contact with the fulvous band along the oblique portion of the inner margin, being nearly concealed by a corresponding streak of silvery irrorations; the anal appendage is black, and surrounded by a lax ciliated white *cilia* which is broader internally. *Thorax* and *abdomen* brown above and white underneath, the latter being banded at the sides. *Feet* white annulated with black. *Antennæ* also delicately annulated, and the club has a broad white ring at its base and a ferruginous tip."

"The resemblance in general habit, in the outline of the wings, and in the characteristic marks of the lower surface, between this species and *S. nedymond*, Cramer, is so striking as to cause an inquiry, whether, notwithstanding the palpable difference in colour, they might be no more than different sexes of the same species. A careful examination has however convinced me that this is not the case. In *S. nedymond* the upperside of the hindwing is without the least indication of the ocellate spots in the anal region; in the underside the fascia, dividing the posterior portion of the forewing, has a different direction, and in the hindwing of the same species the dimidial portion has not any indication of a transverse discoidal striga, whereas *S. chitra* has a very distinct transverse line on the disc of the same wing. Our collection contains six specimens of *S. chitra* and seven of *S. nedymond*, which individually closely agree with the description given of them." (*Horsfield*, l. c.)

"Dr. Horsfield's description evidently applies to a female specimen, and of the male sex I can find no account. It probably has a bluish gloss above, and is evidently allied to the preceding species. What is the female of *S. nedymond*? and what is the male of *S. chitra*? There is certainly no great reason why the two species (?), as at present known, should not be classed as male and female *S. nedymond*. The only reason why that course is not followed here, is owing to the fact, that the female *S. chitra* has a more curved upper tail than the male *S. nedymond*, and the ground-colour beneath being somewhat diverse. When the insects are bred the above supposition may not improbably prove correct" (*Distant*, l. c.)

I have only seen one specimen of this species sent me by Mr. W. Davison from Jelebu. The difference in the coloration and markings on the underside between *S. nedymond* and *S. chitra* is certainly very great, and I do not know a parallel instance in the *Lycænidæ*, except to a less extent in the genus *Bindahara*, Moore; notwithstanding this fact, I have but little doubt that the two are opposite sexes of one species. The markings and coloration of both sides of *S. chitra* are almost exactly the same as in *Araotes lapithis*, Moore.

"In the forewing the costal nervure terminates opposite to the end of the discoidal cell, the base of the second subcostal nervule is nearer to the base of the first than it is to the base of the upper discoidal nervule, the third subcostal originates about midway between the base of the upper discoidal nervule and the apex of the wing, which it does not reach, the middle and lower disco-cellular nervules are concave, upright, the middle one-third shorter than the lower, originating from the upper discoidal nervule but a little distance from its base, the second median nervule originates some little distance before the lower end of the cell, submedian interspace broad. Male without secondary sexual characters on either wing. In the hindwing the costal nervure is very strongly arched at the base, the first subcostal nervule originates some little distance before the apex of the cell, the disco-cellular nervules are strongly outwardly oblique and in a straight line, the upper slightly shorter than the lower, the second median nervule originates just before the lower end of the cell. The palpi are conspicuously thicker and longer in the female than in the male. The eyes are hairy.

It is more than probable that true *Deudorix* is confined to the single type species, and that the other species here included in it is not a true *Deudorix* at all. Mr. Trimen in his "South-African Butterflies" gives four South African species of *Deudorix*, but as they all have the secondary sexual characters in the male found in *Rapala*, Moore, and allied genera, they are not true *Deudorices* from my point of view. The male of *D. epijarbas* is rather deep red on the upperside, the costa and outer margin of the forewing black, the costal base of the hindwing black. The female is fuliginous-black on the upperside, somewhat inclined to fulvous on the disc of the forewing. Both sexes have a broad catenulated white band on the disc of both wings on the underside, the disco-cellular nervules also marked with a white line on either side, the anal lobe of the hindwing black, a black spot with outer orange ring in the first median interspace on the margin, with some metallic greenish scales between the anal lobe and black spot. *D. barthema*, Distant, I have not seen, but it is evidently a very different-looking insect. The female alone is known. On the upperside it is probably very similar to the same sex of *D. epijarbas*, on the underside however it is quite different, having a yellow instead of a pale brown ground, the catenulated band of *D. epijarbas* replaced by a linear fascia. The transformations of *D. epijarbas* will be found detailed under the description of the species.

Key to the Indian species of Deudorix.

A. Female, underside, ground-colour pale brown, a prominent discal white catenulated band.
  986. D. EPIJARBAS, India, Ceylon, Andamans and Nicobars, Burma, Malay Peninsula and Archipelago.

B. Female, underside, ground-colour yellow, an obscure discal linear fascia.
  987. D. BARTHEMA, Chittagong district, Malay Peninsula.

986. **Deudorix epijarbas**, Moore. (PLATE XXIX, FIG. 238 ♂).

Dipsas epijarbas (recte *epiarbas*), Moore, Horsfield and Moore, Cat. Lep. Mus. E. I. C., p. 32, n. 40 (1857); *Deudorix epijarbas*, Hewitson, Ill. Diurn. Lep., p. 20, n. 8, pl. vii, figs. 16, 18, *male*; 17, *female* (1863); id., Moore, Proc. Zool. Soc. Lond., 1877, p. 589; idem, id., Lep. Cey., vol. i, p. 103, pl. xxxix, figs. 4, *male*; 4a, *female* (1881); id., Distant, Rhop. Malay., p. 464, n. 6, pl. xli, fig. 5, *male* (1886); id., Staudinger, Ex. Schmett., p. 278, pl. xcvi, *male* (1888); *Deudoryx epijarbas*, Butler, Proc. Zool. Soc. Lond., 1886, p. 370, n. 57; *Deudorix epiarbas*, Doherty, Journ. A. S. B., vol. lv, pt. 2, p. 126, n. 125 (1886).

HABITAT: Throughout India (except the desert tracts and very high elevations in the Himalayas), Ceylon, the Andaman and Nicobar Isles, Burma, the Malay Peninsula, Nias Island, Borneo, Macassar, Celebes.

EXPANSE: ♂, 1·4 to 1·9; ♀, 1·3 to 2·0 inches.

DESCRIPTION: "Larger than *D.* [*Rapala*] *jarbas*, Fabricius. MALE. UPPERSIDE, *forewing* with the dark brown border occupying the whole space between the costa and the median nervure (in the latter of which it is nearly black), and then branching off to the exterior margin, and ending in a point at the middle of the hind margin. UNDERSIDE, *both wings* of a duller tint, with two whitish undulating lines crossing both wings, as also two short lines from the

median to the subcostal nervure [enclosing the disco-cellular nervules. *Hindwing*]. The outer black spot is entirely encircled with yellow, and above the anal spot is a well-defined lunar-shaped streak of metallic green. FEMALE, somewhat larger, with rounder wings. UPPERSIDE, *both wings* fulvous-brown. UNDERSIDE, *both wings* marked as in the male." (*Moore*, l. c. in Cat. Lep. Mus. E. I. C.)

LARVA when full-fed and extended in walking, ·9 of an inch in length; ground-colour dull ochreous, blotched with leaden-black, the surface of all the segments smooth and shining, the constrictions between the segments well-marked, each segment with a shallow dorsal pit, a subdorsal pit on each side, and a lateral pit which bears the deep-black spiracles; the entire lateral edge of the larva furnished with rather long bristly hairs; the larva is of the usual lycænid shape, the head small and entirely retractile into the second segment, dull ochreous marked with leaden-black as are the segments; the body increasing in width to the fourth segment, then gradually decreasing to the anal segment; the larva is rather depressed, broader than high, the three anal segments are scutate, the shield being used to block up the entrance to the fruit on which the larva feeds; the second and third segments are brighter ochreous than the rest, the blackish markings more sparse, wholly absent on the anterior portion of the second segment. I can find no trace whatever of the special organs found in many *Lycænidæ* larvæ which are affected by ants. Feeds on the fruit of the pomegranate. PUPA ·55 of an inch in length, light reddish-brown speckled with black in no decided pattern; the surface rather rough above and covered sparsely with short stout white bristles, below quite smooth, of a lighter colour, and without the black speckles and bristles; shape everywhere rounded except anteriorly, where the head is anteriorly bounded by a sharp ridge, the thorax very slightly humped, the anal segment depressed, pointed. Described from specimens sent to me by Mr. P. W. Mackinnon and obtained by him at 4,000 feet elevation below Masuri.

D. epijarbas (*epiarbas* would be a more correct rendering of this name) is a very wide-spread and common species occurring almost everywhere in India (except the desert tracts of the North-West), throughout the outer ranges of the Himalayas and in Kashmir (but not on the inner higher ranges), in Ceylon, the Andamans, on Teressa and Great Nicobar, in Perak, Nias Island, and several islands in the Malay Archipelago. It has an extremely rapid flight, but often settles, and is then easily caught. In Sikkim it occurs in March, May, June, and October, probably throughout the warmer months. I give as a foot-note* a later description of this species by Mr. Moore.

The figure shews both sides of a male example from Kulu in my collection.

987. Deudorix barthema, Distant.

D. barthema, Distant, Rhop. Malay., p. 280, n. 5 (1885); id., Doherty, Journ. A. S. B., vol. lv, pt. 2, p. 260, n. 14 (1886); *Deudorix xenophon*, Hewitson (*nec* Fabricius), Ill. Diurn. Lep., p. 21, n. 10, *female* (1869); *Myrina megistia* (?), Butler (*nec* Hewitson), Trans. Linn. Soc. Lond., Zoology, second series, vol. i, p. 549, n. 1 (1877).

HABITAT: Dimagiri and Barakhal, Chittagong Hill Tracts (*Doherty*); Province Wellesley, Malacca, Singapore (*Distant*).

EXPANSE: ♀, 1·2 to 1·4 inches.

DESCRIPTION: "FEMALE. UPPERSIDE, *both wings* fuliginous-brown. *Hindwing* with a black spot at the lobe of the anal angle. UNDERSIDE, *both wings* yellow, with a very

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* "MALE. UPPERSIDE, *both wings* red, veins black. *Forewing* with a broad black costal and outer marginal band, the posterior margin also black. *Hindwing* with the costal area broadly black, abdominal margin greyish-brown, an anal spot, *cilia*, and *tail* black. UNDERSIDE, *both wings* pale vinous-brown. *Forewing* with two slender white disco-cellular streaks, two transverse discal lines, and a less distinct marginal line. *Hindwing* with two disco-cellular streaks, two curved discal broken lines and a less distinct marginal line; anal lobe black; a red-bordered black spot between the second and first median nervules, a metallic green and black-speckled streak above the anal lobe. FEMALE. UPPERSIDE, *both wings* olive-brown. UNDERSIDE, *both wings* ochreous-grey; otherwise as in the male. *Head* with the front and sides, *palpi* beneath, and *legs* white; palpi above and the bands on the legs black." (*Moore*, l. c. in Lep. Cey.)

narrow and linear slightly darker fascia outwardly margined with greyish, situated between the ends of the discoidal cells and the outer margins, angulated and inwardly margined with fuscous from the second median nervule of the hindwing to the abdominal margin, where it is duplex. *Hindwing* with three marginal spots near the anal angle, the first and third black, the medial one composed of greenish scales; extreme outer margin narrowly greyish. *Cilia* pale brownish."

"I have not seen the male of this species. [The female] is, however, closely allied in colour to the male of *D. domitia*, Hewitson, wanting, however, the black spots on the underside of the forewing, which renders it easily distinguishable." (*Distant*, l. c.)

"The yellow colour of the underside of the female, which is not uncommon in the Chittagong Hill Tracts, varies greatly in different specimens. I suspect that the male will be found to be of the usual dull rufous hue of below, characteristic of the group, and will perhaps be difficult to distinguish from some well-known species." (*Doherty*, l. c.)

I have not seen this species, but it may be known at once from the other species of the genus occurring within Indian limits by the yellow colour of the ground on the underside. I do not know why Mr. Distant gives the *Deudorix* (*Rapala*) *xenophon* of Hewitson as a synonym of this species, unless there are specimens of *D. barthema* in the Hewitson collection which Hewitson has identified as *xenophon*. As far as the description goes the only differences I can detect between *D. barthema* and females of *R. xenophon* are that in the latter the anal lobe of the hindwing on the upperside has more than the larger half ochreous-ferruginous, on the underside the short disco-cellular lines on both wings are not mentioned in *D. barthema*, and that in *R. xenophon* the outer black spot on the hindwing in the first median interspace is crowned with orange. *D. barthema* is still nearer to *Rapala suffusa*, Moore, the latter possessing all the characters distinguishing *R. xenophon* from *D. barthema*, except that the black spot on the margin in the first median interspace on the underside of the hindwing is crowned with orange in only one specimen in my possession. It probably possesses in the male secondary sexual characters, and does not therefore belong to the genus *Deudorix* at all. It is a most puzzling species, and not having seen specimens or a figure I can make nothing out of it.

Genus 170.—ZINASPA, nov. (PLATE XXIX).

Allied to *Rapala*, Moore, from which it differs in both sexes in the *antennæ* being shorter, the *palpi* nearly twice as long and stouter (much longer in the female than in the male), and the MALE lacking the tuft of hair on the inner margin of the forewing, and the glandular patch below the costa of the hindwing present in that genus. The *eyes* are naked.

As far as I can ascertain without destroying a specimen, the neuration of the two Indian species I include in the genus does not differ from that of *Rapala*. The markings of the underside, however, are so entirely different from those of any species of *Rapala*, that from them alone one would come to the conclusion that *Z. todara*, Moore, and *Z. distorta*, de Nicéville, must be generically distinct from *Rapala*. They at once remind one, however, of those obtaining in the genus *Surendra*, Moore, though they differ a good deal in detail. In *Zinaspa* the forewing on the underside has no markings towards the base whatever, in *Surendra* there is a bar across the middle of the cell, a double line closing the cell, and several short streaks on the costa. On the hindwing there are usually no basal markings in *Zinaspa*, and the discal markings are more regular and nearer the margin. There is also a small black spot crowned with orange in the first median interspace never found in *Surendra*. *Zinaspa* is perhaps nearer even to *Deudorix*, Hewitson, than it is to *Rapala*, but the male may at once be known by the costa of the forewing being arched instead of straight, and the inner margin much longer, thus giving a more square appearance to that wing.

Two species only are known, one occurs in Sikkim, Assam, and Burma, the other in the Nilgiri Hills of South India. The females appear to be very much commoner than the males, as obtains also in the genus *Surendra*.

Key to the species of Zinaspa.

A. Male, upperside, hindwing uniformly brown; female, upperside, forewing with the discal area blue
988. Z. TODARA, Nilgiri Hills.

B. Male, upperside, hindwing with a large patch of shining purple; female, upperside, forewing with the discal area bluish-purple.
989. Z. DISTORTA, Sikkim, Assam, Burma.

988. Zinaspa todara, Moore.

Surendra todara, Moore, Proc. Zool. Soc. Lond., 1883, p. 530; *Rapala distorta*, Hampson (*nec* de Nicéville), Journ. A. S. B., vol. lvii, pt. 2, p. 359, n. 138 (1888).

HABITAT: Coonoor, Nilgiris.

EXPANSE: ♂, 1·25; ♀, 1·55 inches.

DESCRIPTION: "MALE. UPPERSIDE, *both wings* dark violet-brown. *Forewing* with the basal area below the costal nervure pale violet-blue. *Hindwing* uniformly brown. UNDERSIDE, *both wings* pale ochreous-brown, indistinctly grey-speckled. *Forewing* with a discal transverse indistinct white lunular line, and two less distinct marginal lines. *Hindwing* with a subbasal and two discal transverse white lunular zigzag lines, and a small black subanal spot surmounted with ochreous-red."

"In this species the forewing is narrower than in its allies [of the genus *Surendra*], and the hindwing is more convex. It is quite distinct from the Madras species, *S. biplagiata*, Butler, the figure of which does not well represent the angular margin of the hindwing of the type specimen." (*Moore*, l. c.)

"Nilgiris, 3,000 feet. One female in August of this year on the southern slopes, and eight females on the western slopes, 1,000-2,500 feet, in September, 1888. Differs from the description and figure of *R.* [=*Z.*] *distorta*, de Nicéville, in having the blue area on the upperside of both wings more restricted, and on the underside the white lines more regular and split up into well defined lunules." (*Hampson*, l. c.)

I have not seen a male of this species; it appears to differ from that of *Z. distorta*, mihi, in having the upperside of the hindwing uniformly brown, while in *Z. distorta* there is a large patch of shining deep purple on the disc. The female of *Z. todara* differs from that of *Z. distorta* in having the discal patch on the upperside of the forewing blue instead of purple, and more restricted. The markings of the underside appear to be much the same.

Mr. G. F. Hampson examined the type of this species, and kindly informed me that it is not a *Surendra*; I should otherwise have been unable to have recognised the species. He has also given me two specimens.

989. Zinaspa distorta, de N. (PLATE XXIX, FIG. 239 ♂).

Rapala distorta, de Nicéville, Proc. Zool. Soc. Lond., 1887, p. 461, pl. xl, fig. 6, *female*.

HABITAT: Sikkim, Assam, Burma.

EXPANSE: ♂, 1·40 to 1·55; ♀, 1·60 inches.

DESCRIPTION: MALE. UPPERSIDE, *both wings* black. *Forewing* with the basal and lower discal areas very deep shining purple, the costal margin broadly, the outer margin still more broadly and the apex broadest of all, of the ground-colour, the purple coloration occupying about two-thirds of the surface of the wing. *Hindwing* with the basal and lower discal areas very deep shining purple, the costa and apex extremely broadly, the outer margin narrowly black, the abdominal margin pale fuscous. UNDERSIDE, *both wings* as in the female but of a deeper vinous colour, all the markings rather less prominent. "FEMALE. UPPERSIDE, *both wings* almost black, somewhat paler on the hindwing. *Forewing* with all but the costa widely, the apex and outer margin still more widely (which are of the ground-colour), rich bluish-purple. *Hindwing* with a lengthened discal patch of bluish-purple, which occupies the lower half of the discoidal cell and extends beyond it into the discoidal and median interspaces, but does not nearly reach the outer margin, [this patch is sometimes entirely wanting]. *Tail* dull ferruginous, tipped with white. UNDERSIDE, *both wings* dull ferruginous or cinnamon-coloured,

glossed with vinous. *Forewing* with a narrow white discal line formed of short lunules between the veins, that portion below the first median nervule shifted inwards ; a double submarginal series of short white lines, more diffused than the discal line, placed between the veins, which give the appearance of six increasing spots of the ground-colour defined with white. *Hindwing* with a discal white line as in the forewing, but much more distorted and irregular ; an obscure similar basal line, and a submarginal very dentate one ; the area beyond the latter irrorated with whitish, including an obscure rounded ferruginous spot in the first median interspace [sometimes centred with black] ; a fine white anteciliary line obsolete anteriorly. *Cilia* brownish-ferruginous throughout."

"Allied to *Rapala* [*Surendra*] *amisena*, Hewitson, who describes and figures the female while Mr. Distant figures the opposite sex, both from Singapore. Differs from the same [female] sex of that species, judging from the figure and description only, in having the purple area of the upperside of the forewing of less extent and sharply defined (in *R. amisena* it appears to be suffused over nearly the whole wing, with no sharp edges), and on the underside of both wings in the markings being fewer and white throughout, instead of dark fuscous ; with no trace of the dull light blue irroration at the anal angle of the hindwing, with a lunular black spot between the tails, described by Hewitson as occurring in his "*Amblypodia*" *amisena*." (*de Nicéville*, l. c.)

Mr. Otto Möller possesses a single male of this species taken in Sikkim on 1st August, 1888, and four females taken in March, May, and July, all at about 1,500 feet elevation. Colonel Swinhoe possesses a single female example, also from Sikkim. In the Phayre Museum, Rangoon, is a single male taken in the Karen Hills, Burma, in March, 1887. It differs from the type specimen described above on the upperside in having the purple coloration of a lighter more blue shade and more extensive, the ground-colour of the underside more reddish. These slight differences seem to be hardly of specific value, and may be due to season, the Burmese specimen having been captured in the dry season, most of the Sikkim ones in the middle of the rains.

The figure shews both sides of the type male specimen from Sikkim in the collection of Mr. Otto Möller.

Genus 171.—HYSUDRA, Moore. (PLATE XXIX).

Hysudra, Moore, Proc. Zool. Soc. Lond., 1882, p. 250.

"Allied to *Bidaspa*, [Moore, =*Rapala*, Moore]. FOREWING, less triangular in form, the exterior margin slightly convex, no tuft on the posterior margin of the male. HINDWING, less produced hindwards, no costal depressed granular spot, tail shorter." (*Moore*, l. c.)

In the forewing the costa is straight, slightly emarginate in the middle, the outer margin is convex, the inner margin straight ; the costal nervure ends opposite to the apex of the discoidal cell ; the first subcostal nervule is bent upwards soon after its origin and almost touches the costal nervure in the male, well separated in the female ; the base of the second subcostal nervule is nearer to the base of the first than to that of the upper discoidal nervule ; the third subcostal emitted about midway between the apices of the cell and of the wing ; the middle disco-cellular nervule originates from the upper discoidal soon after the latter is given off from the subcostal nervure, the disco-cellular nervules are nearly upright, only slightly outwardly oblique, both are slightly concave, the middle one rather shorter than the lower ; the second median nervule is given off some little distance before the lower end of the cell ; there is no long thick tuft of hairs turned upwards from the inner margin near the base in the male as in so many allied genera. In the hindwing the costal nervure is very short, not nearly reaching the apex of the wing ; the disco-cellular nervules are of nearly equal length, very straight and outwardly oblique ; the second median nervule originating just before the lower end of the cell ; there is a depressed (as seen from above) semicircular glandular patch of scales in the male placed above and touching the subcostal nervure, its outer edge not reaching the base of

the first subcostal nervule. This "sexual mark" must have been overlooked by Mr. Moore when characterising the genus. Eyes extremely hairy. Antennæ with a well-formed club.

As far as is known at present, *Hysudra* contains but a single species, which is confined to the Western Himalayas. The genus is aberrant, as the male has no tuft of hairs on the inner margin of the forewing, this feature being unique amongst Indian *Lycænidæ* when combined with the glandular patch on the hindwing, and would tend to show that the two organs have no inter-relation. I have often thought it possible that the "glandular patch" excreted some odour which is agreeable to the females of the species, or that an odour is given off which is distasteful to its enemies, which odour is dissemitated by the brush of hairs which comes in exact contact with it. If this is the case, we have in *Hysudra* the scent gland without the scent disseminator.

990. **Hysudra selira,** Moore. (PLATE XXIX, FIG. 240 ♂).

Deudorix selira, Moore, Proc. Zool Soc. Lond., 1874, p. 272, n. 76 ; *Hysudra selira*, id., l. c., 1882, p. 250 ; id., Doherty, Journ. A. S. B., vol. lv, pt. 2, p. 126, n. 127 (1886) ; *Deudorix nissa* (part), Hewitson (*nec* Kollar), Ill. Diurn. Lep., p. 23, n. 19, pl. x, fig. 44, *female* (*nec* figs. 42, 43), (1863).

HABITAT : Western Himalayas, Kashmir.

EXPANSE : ♂, 1·25 ; ♀, 1·25 to 1·45 inches.

DESCRIPTION : "MALE. UPPERSIDE, *both wings* blackish-brown, suffused with bluish-purple. *Cilia* dull yellow. *Forewing* with a large quadrate orange-red discal patch. *Hindwing* with a broad orange-red exterior marginal band crossed by the dark veins. UNDERSIDE, *both wings* pale fawn-colour, [disco-cellular nervules marked with two short lines], crossed by a brown discal narrow band with white outer border. *Hindwing* with a white marginal line, a small subanal black spot bordered with red, and a large black anal spot bordered with white." FEMALE. UPPERSIDE, *both wings* with the orange-red markings larger than in the male. UNDERSIDE, *both wings* as in the male.

"Allied to *D.* [=*Rapala*] *nissa*, Kollar, and figured as its female by Hewitson." (*Moore*, l. c. in Proc. Zool. Soc. Lond., 1874).

"A few taken in Naini Tal, 5,500-6,500 feet, in April and May, one in the middle of September" (*A. M. Lang*). "Almora, Pyura, 4-6,000 feet, Kumaon" (*Doherty*). I have found this species somewhat rarely in many parts of the Western Himalayas and Kashmir. At Masuri Mr. P. W. Mackinnon has observed the female ovipositing on the wild Indigo, *Indigofera atropurpurea*. The imago probably hibernates, and lays her eggs in the Spring.

The figure shews both sides of a male specimen from Masuri in my collection.

Genus 172.—**RAPALA,** Moore. (PLATES XXV and XXIX).

Rapala, Moore, Lep. Cey., vol. i, p. 105 (1881); id., Distant, Rhop. Malay., p. 276 (1885) ; *Nadisepa*, id., Proc. Zool. Soc. Lond., 1882, p. 249 ; *Baspa*, *Bidaspa*, id., l. c., p. 250 ; *Vadebra*, id., l. c., 1883, p. 528.

"Allied to *Virachola*, Moore. WINGS, small. FOREWING, comparatively shorter and less acutely triangular in form ; *exterior margin* slightly convex ; furnished with a broad tuft of hair on the middle of the posterior margin beneath [in the male]. HINDWING, less produced hindwards, more convex exteriorly ; *anal angle* lobed ; a single *tail* from the end of the first median nervule, male with a broad conical-shaped glandular depression between the costal and subcostal nervures, but which does not extend below the subcostal. *Palpi* shorter than in *Virachola*, second joint more laxly squamose. Type, *R. varuna*, Horsfield." (*Moore*, l. c.)

In the forewing the costal nervure terminates at about opposite to the apex of the cell, the base of the second subcostal nervule is much nearer to the base of the first than to that of the upper discoidal nervule ; the disco-cellular nervules are nearly upright (only slightly outwardly oblique), both are concave, the middle rather shorter than the lower ; the second median nervule originates a short distance before the lower end of the cell ; male with tuft of hair as described by Mr. Moore ; and, in addition, there is in some species a patch of differently-formed scales from those on the rest of the wing on the upperside at and beyond the end of the

discoidal cell. In the hindwing the disco-cellular nervules are outwardly oblique, straight, and of equal length, the second median nervule originating just before the lower end of the cell; male with a glandular patch of scales placed above and against the subcostal nervure, extending a little distance along the base of the first subcostal nervure, usually semicircular, but variable both in shape and size. Eyes finely hairy.

It will be observed from the synonomy above that I have sunk four of Mr. Moore's quite modern genera. In any case *Vadebra* has to go, as Mr. Moore used that name twice in the same year for two distinct genera, its earlier application to a group of *Euplœa* will have to stand (*Vide* Proc. Zool. Soc. Lond., 1883, p. 260). I have carefully bleached and mounted as microscopic slides specimens of both sexes of typical species of all these five genera. I cannot find a single structural character by which any one of them can be separated off from the rest. By general *facies* I can divide the genus *Rapala* as understood by me into two groups; in the first the males are all of some shade of blue on the upperside (this includes the true *Rapalas*, *Bidaspa*, and one species of *Vadebra*, viz., *lankana*, Moore); in the other group the males are all of some shade of red (this includes *Nadisipa*, *Baspa*, and all the Indian species of *Vadebra* except *lankana*) It is probable that my *Rapala tara* is not a true *Rapala*, as it has a conspicuous black patch in the male in the middle of the forewing on the upperside, and also a large shining polished space on the inner margin of the hindwing on the underside, across which lies the long black tuft of hairs, which is a character found in no other species of the genus. Lastly there is the *Deudorix deliochus* of Hewitson, the male of which I have never seen. It cannot be a true *Deudorix*, as it has male secondary sexual characters. I do not know what genus to put it in, so have placed it here. It is quite aberrant in coloration and markings, the upperside is very like the male of *Camena icetas*, Hewitson, the underside is quite peculiar, having four parallel white linear bands. Neither of these aberrant species can however come into those genera of Mr. Moore which I have discarded; should they ultimately be found to represent genera distinct from *Rapala*, new ones must be erected for them. I append descriptions of these synonymic genera as given by Mr. Moore, with some remarks of my own upon them.*

The transformations of three species are known, viz., *R. schistacea*, Moore, *R. jarbas*, Fabricius, and *R. xenophon*, Fabricius, and will be found detailed under the separate descriptions of those species. The first differs widely in structure from the other two.

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* Genus *Nadisepa*, Moore, Proc. Zool. Soc. Lond., 1882, p. 249. "Allied to *Deudorix*, Hewitson. FOREWING, more acuminate at the apex, male furnished with a tuft of hair on the middle of the posterior margin. HINDWING, more attenuated hindwards, exterior margin slightly sinuous, a broad conical depressed glandular spot between the costal and subcostal nervures. *Venation* similar to *Deudorix*. *Palpi*, smaller, shorter, second joint of more equal width, club of the *antenna* shorter." (*Moore*, l. c.) Type *Papilio jarbas*, Fabricius.

Nadisepa has the neuration and male secondary sexual characters as in *Baspa*, Moore, but differs in the shape of the wings, which are broader, the forewing with the costa slightly less emarginate, the outer margin less inwardly oblique, the inner margin consequently longer; the hindwing has the outer margin convex, the abdominal margin shorter, the wing more compact, and less produced towards the anal angle. The sexes differ conspicuously in colour, in *Baspa* they are nearly alike. The genus contains two Indian species, *N. jarbas*, Fabricius, and *N. xenophon*, Fabricius.

Genus *Baspa*, Moore, Proc. Zool. Soc. Lond., 1882, p. 250. "Differs from typical *Deudorix* (*D. epijarbas*, Moore). MALE with a less triangular form of FOREWING. HINDWING more oblique on the costal and exterior margins, the apex very convex, venation similar. FEMALE, forewing more triangular, hindwing narrower and less convex. Second joint of *palpi* much shorter, club of *antenna* much shorter and abruptly formed. Sexes alike in colour." (*Moore*, l. c.) Type *Papilio melampus*, Cramer.

The forewing has the costa sinuous in both sexes, being slightly emarginate in the middle, the outer margin very straight and oblique, the inner margin short, with, in the male only, a tuft of hairs concolorous with the underside of the wing attached to the margin and folded upwards, the margin at that point being slightly bowed outwardly. *Hindwing* with the outer margin very straight and oblique, slightly angled at the termination of the second median nervule, with, in the male only, a round glandular depression (as viewed from the upperside) placed against the subcostal nervure, its outer lower edge extending slightly along the base of the first subcostal nervule.

Baspa has the same neuration and secondary sexual characters as *Nadisepa*, Moore, differing from the latter in the outline of the wings, the forewing being distinctly narrower, the costa slightly more emarginate, the outer margin straighter and more oblique, the inner margin shorter; the hindwing is also distinctly narrower, the outer margin straighter and more oblique. The sexes are nearly alike in colour on the upperside, the female being a duller brick red than the male, while in *Nadisepa* the sexes differ in colour conspicuously.

Mr. Distant places the genera *Nadisepa*, *Baspa*, and *Vadebra* (the latter name is preoccupied) as synonyms of *Deudorix*. The diagnoses of these genera are certainly very insufficient, but they are at once distinguishable from *Deudorix* by the presence of the secondary sexual characters above described, which *Deudorix* entirely lacks. A single species of *Baspa* is at present known, viz., *B. melampus*, Cramer, which occurs more or less throughout India (except the desert tracts, Assam and Burma), and in Ceylon, Nias Island, and Sumatra.

Key to the Indian species of Rapala.

A. Both sexes of some shade of blue or purple on the upperside.

a. Both sexes, upperside, forewing with lower discal area, hindwing except costa broadly, lilac blue (more restricted in the female); underside, forewing with four parallel white linear bands.

991. R. DELIOCHUS, Burma.

b. Male, upperside, both wings black, shot with iridescent blue in certain lights only.

*a*¹. Male, upperside, forewing with round black sexual patch on disc; underside with polished patch from inner margin; ground-colour ochreous-brown.

992. R. TARA, Kumaon, Sylhet.

*b*¹. Male without secondary sexual characters as in *R. tara*; upperside in certain lights most brilliant deep ultramarine-blue; underside, ground-colour dull pale fuscous.

993. R. SPHINX, Sylhet, Burma, Java.

*c*¹. Male, upperside rather less brilliantly shot than *R. sphinx*; underside, ground-colour pale ochreous, sometimes glossed with purple.

994. R. BUXARIA, Sikkim, Bhutan.

*d*¹. Male, upperside deep slatey-blue, lower discal area only of forewing and disc of hindwing shot with blue; underside, ground-colour buff-grey.

995. R. SCHISTACEA, Himalayas, N.-W. Provinces, Bengal, Assam, Orissa, Ganjam, Nilgiris, Ceylon, Andamans.

*e*¹. Male, upperside, pale violet-brown, lower discal area only of forewing and disc of hindwing shot with purple; underside, ground-colour pale ferruginous.

996. R. (*Vadebra*) LANKANA, North Kanara, Nilgiris, Ceylon.

c. Male, upperside, both wings very dark indigo-blue, hindwing only shot with brilliant iridescent blue in certain lights.

997. R. SCINTILLA, Sikkim.

d. Male, upperside, both wings deep steely-blue, no iridescent shot.

*a*¹. Underside dull brownish, discal band broad.

998. R. ORSEIS, Sikkim, Malda, Bengal, Orissa, Nilgiris, Bombay, Assam, Burma, Andamans and Nicobars, Singapore, Sumatra.

999. R. GRISEA, Western Himalayas.

1000. R. LAZULINA, Nilgiris, Ceylon.

*b*¹. Underside rosy pink, discal band narrow.

1001. R. ROSACEA, Sikkim, Khasi Hills.

*c*¹. Underside pale or ochreous-brown, discal band narrow.

1002. R. (*Bidaspa*) NISSA, Himalayas, Assam, Sumatra.

*d*¹. Underside pale vinous brownish-buff, discal band narrow.

1003. R. (*Bidaspa*) RECTIVITTA, North Cachar.

B. Male of some shade of red on the upperside, shot with iridescent purple in some lights; females various.

a. Male, upperside, rufous; forewing with outer margin narrowly and decreasingly black; female, upperside dull steely-blue.

1004. R. (*Vadebra*) PETOSIRIS, Sikkim, Orissa, Assam, Burma.

b. Male, upperside, rufous; forewing with outer margin broadly black; female, upperside, shining fuscous, very similar to that sex of *R. xenophon*.

1005. R. (*Vadebra*) SUFFUSA, Sylhet, Burma.

c. Male, upperside, scarlet; forewing, with outer black margin not ending in a point; hindwing with anal lobe black marked with ochreous and metallic greenish; female, upperside dull brick-red.

1006. R. (*Baspa*) MELAMPUS, India, Ceylon, Nias Island, Sumatra.

d. Male, upperside scarlet, wings broader than in *R. melampus*; forewing with outer black margin ending in a point; hindwing with anal lobe ochreous-scarlet, bearing outwardly a small black spot; female, upperside testaceous, with a slight cupreous lustre.

1007. R. (*Nadisepa*) JARBAS, Sikkim, Bhutan, Assam, Burma, Malay Peninsula, Siam, Java.

e. Male, upperside scarlet, but that colour confined to a small patch on forewing, base of hindwing black; female, upperside uniformly deep brown.

1008. R. (*Nadisepa*) XENOPHON, Bengal, Assam, Burma, Malay Peninsula, Andamans, Nias, Sumatra, Java.

Genus *Bidaspa*, Moore, Proc. Zool. Soc. Lond., 1882, p. 250. "Nearest to *Virachola*, Moore. FOREWING, comparatively more triangular, *third subcostal nervule* emitted at a slight angle before the end of the cell. HINDWING, less produced hindwards, *costal margin* longer, *apex* less convex, *discoidal cell* triangular, *first subcostal nervule* emitted at one-fifth before the end of the cell, the broad conical depressed *glandular spot*

991. **Rapala deliochus**, Hewitson.

Deudorix deliochus, Hewitson, Trans. Ent. Soc. Lond., 1874, p. 352; idem, id., Ill. Diurn. Lep., Suppl., p. 31, n. 36, pl. va, figs. 68, 69, *male* (1878).

HABITAT: East India (*Hewitson*); Rangoon.

EXPANSE: ♂, 1·3; ♀, 1·5 inches.

DESCRIPTION: "MALE. UPPERSIDE, *forewing* dark brown; the inner margin (which is slightly curved outwards where ornamented by a tuft of hair) from its base to its middle, and bounded above by the median nervure, lilac-blue. *Hindwing* with one tail, lilac-blue; the costal margin polished near the base, dark brown below; the lobe, which is very prominent, orange and black. UNDERSIDE, *both wings* ferruginous, crossed by four distinct linear bands of white, the fourth band [in the *forewing*] near the apex, short; both crossed by two submarginal bands of lunular white spots. *Hindwing* with a black caudal spot, bordered with orange, and an anal black spot, irrorated with silver-blue." (*Hewitson*, l. c. in Trans. Ent. Soc. Lond.)

This is a very extraordinary species, and as far as I know has no near ally, certainly not in India. The four parallel white linear bands on the underside have a very curious appearance, and would enable one at a glance to recognise it. On the upperside it is a good deal like *Camena icetas*, Hewitson, but has one tail only. I have removed it from the genus *Deudorix*, as Mr. Hewitson expressly says that it has male secondary sexual characters.

Since the above was written, I have received two females of this species from Rangoon, taken in June and August. They differ from the figure of the male on the upperside in having the blue coloration of a duller shade, of greater extent, in the forewing the disco-cellular nervules marked with a black line; in the hindwing the blue colour does not nearly reach the outer margin as it does in the male, and all the veins are black. The white linear markings of the underside of this species are quite peculiar and are very prominent. In the forewing there is a white line across the cell near its end, continued beneath the cell to the submedian nervure; then a straight line beyond the cell from the subcostal almost to the submedian nervure; beyond which is another line, curved, anteriorly twice dislocated inwards, which meets the second line posteriorly; the fourth line is short, reaches from near the third median nervure to the costa, anteriorly broken; there is a very faint line defining the disco-cellular nervules, and two highly lunulated submarginal lines. The hindwing is crossed by four discal highly fractured white lines, the submarginal lines as in the forewing, the anal markings as described by Mr. Hewitson.

992. **Rapala tara**, de N. (PLATES XXV, FIG. 150 ♂, and XXIX, FIG. 241 ♀).

R. tara, de Nicéville, Journ. A. S. B., vol. lvii, pt. 2, p. 284, n. 14, pl. xiv, fig. 11, *male* (1888).

HABITAT: Sylhet, Naini Tal.

EXPANSE: ♂, 1·60; ♀, 1·65 inches.

DESCRIPTION: "MALE. UPPERSIDE, *both wings* black glossed with rich deep purple-blue in some lights, somewhat as in *R. sphinx*, Fabricius (a common species in Sylhet and Burma, and figured by Hewitson as *Deudorix varuna*), but not of so brilliant or rich a shade. *Forewing* with a prominent round velvety black sexual patch on the middle of the disc extending slightly into the discoidal cell and traversed by the bases of the two lower median

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terminates before reaching the first subcostal nervule, and does not extend below into the cell; *tail* slender. *Palpi* less compactly squamose, club of the *antennæ* shorter. Type *B. nissa*, Kollar." (*Moore*, l. c.)

This genus is of course quite distinct from *Virachola*, but it does not differ structurally from *Rapala*, Moore, *Nadisepa*, Moore, and *Baspa*, Moore. Mr. Moore incorrectly describes the glandular spot on the hindwing, it is exactly similar in shape and occupies the same position as in the above-named genera, and extends a short distance along the base of the first subcostal nervule. The genus contains *B. nissa*, Kollar, and *B. rectivitta*, Moore.

Genus *Vadebra*, Moore, Proc. Zool. Soc. Lond., 1883, p. 528. "Intermediate between *Nadisepa*, Moore, and *Rapala*, Moore. MALE with the outline of the WINGS more of the form of the latter. FOREWING, however, more acuminate, *exterior margin* more oblique and even, tuft of hairs on the inner margin the same. HINDWING, somewhat broader posteriorly, glandular depression prominent. *Palpi* smoother, club of the *antennæ* longer and more pointed. Type *V. petosiris*, Hewitson." (*Moore*, l. c.)

This genus contains *V. petosiris*, Hewitson, *V. suffusa*, Moore, and *V. lankana*, Moore.

nervules. *Cilia* black, on the hindwing white from the second median nervule to the anal angle. *Hindwing* with the anal lobe marked with a small ochreous spot. UNDERSIDE, *both wings* greenish-ochreous. *Forewing* with two short brownish lines at the end of the cell; a regularly-curved narrow brown discal band from the costa to the submedian nervure. *Hindwing* with the disco-cellular lines as in the forewing, the discal band also, but outwardly very irregular, finely defined with white; a similar short oblique band on the middle of the abdominal margin; a round black spot on the margin in the first median interspace faintly crowned with ochreous; the anal lobe black, the space beyond sprinkled with black and white; fine anteciliary black and white lines becoming obsolete anteriorly; *tail* long, black, tipped with white. FEMALE. UPPERSIDE, *both wings* dull purple, entirely lacking the rich deep purple gloss present in the male. UNDERSIDE, *both wings* bright ochreous, the markings as in the male."

"Described from several examples of both sexes obtained in Sylhet by the native collectors of the Rev. Walter A. Hamilton, also from two females taken by Colonel A. M. Lang, R. E., one at Naini Tal, 5,000 feet, on 29th September, the other at Nalaina, near Naini Tal, 4,200 feet, on 22nd September, 1887. The blue coloration of the upperside of the male is different from that of any species known to me; the 'male-mark' on the upperside of the forewing is also more prominent than in any other species of the genus and different in character; it is present in *R. orseis*, Hewitson, but is less distinct, and is altogether absent in *R. sphinx*, Fabricius." (*de Nicéville*, l. c.) Since the above was written I have received many specimens of both sexes of this species from Sylhet, the wings of one of them, a male, I have bleached. The "scale-mark" on the hindwing is larger than in any other species of the genus, higher than broad, nearly reaching the costal nervure, but occupies the same position as in the other species.

The figure of the male shewing both sides is given on Plate XXV, the figure of the femal also shewing both sides is given on Plate XXIX, drawn from the type specimens from Shillong in my collection.

993. **Rapala sphinx**, Fabricius.

Papilio sphinx, Fabricius, Syst. Ent., p. 520, n. 326 (1775); *Deudorix sphinx*, Butler, Cat. Fab. Lep. B. M., p. 180, n. 3 (1869); *D. varuna*, Hewitson (*nec* Horsfield), Ill. Diurn. Lep., *Lycænidæ*, p. 22, n. 16, pl. ix, figs. 32, 33, *male*; pl. x, figs. 36, 37, *female* (1863).

HABITAT: East Indies (*Fabricius*), Sylhet, Burma, Java.

EXPANSE: ♂, ♀, 1·5 to 1·7 inches.

DESCRIPTION: MALE. UPPERSIDE, *both wings* dark indigo-blue in some lights, most brilliant rich deep ultramarine-blue in other lights. *Forewing* with the costa narrowly, the apex widely and decreasingly to the anal angle where it ends in a point, black, this iridescent blue area a little more extensive than in *R. tara*, de Nicéville. *Hindwing* with the costa and outer margin narrowly black, the abdominal margin pale fuscous, the anal lobe black, inwardly with a patch of dull ochreous-ferruginous scales occupying nearly half the lobe. UNDERSIDE, *both wings* dull pale fuscous, with deep black markings; the disco-cellular nervules defined by two short lines; a somewhat broad straight even discal band, in the forewing not extending below the submedian nervure, where it is gently curved inwards, in the hindwing recurved to the abdominal margin; an indistinct submarginal somewhat macular fascia. *Hindwing* with a small orange spot on the margin in the first median interspace centred with black, the anal lobe deep black, with a linear orange bar above it, the space between the spot and the anal lobe slightly sprinkled with silvery scales. *Body* above and beneath, abdomen above concolorous with the wings, abdomen beneath bright ochreous. FEMALE. UPPERSIDE, *both wings* as in the male, but the blue shot not so brilliant or extensive. UNDERSIDE, *both wings* pale ochreous-brown, all the markings dark brown. *Hindwing* with the lower portion of the discal band filled in with ferruginous; a fine anteciliary white line, obsolete anteriorly.

"The *D. varuna* of Horsfield [from Java], though allied to this species, seems to be quite distinct." (*Butler*, l. c.)

I am not quite sure of my identification of this species, as I have only Hewitson's figures to guide me, but in his figure of the male he so clearly endeavours to give the brilliant blue colour of the upperside, and shows the yellow abdomen on the underside, that I have not much doubt of the correctness of my determination. *R. sphinx* is by far the most beautiful species in the genus, and is now recorded from Indian limits for the first time. It appears to be fairly common in Rangoon in July, August, and September, and the Rev. Walter A. Hamilton has taken it in Sylhet.

994. **Rapala buxaria**, de N. (PLATE XXV, FIG. 152 ♂).

R. buxaria, de Nicéville, Journ. A. S. B., vol. lvii, pt. 2, p. 285, n. 16, pl. xiv, fig. 13, *male* (1888).

HABITAT: Bhutan, Sikkim.

EXPANSE: ♂, 1·50 to 1·65 inches.

DESCRIPTION: "MALE. UPPERSIDE, *both wings* dark brown overlaid with a deep steel-blue gloss, in certain lights almost the whole surface shows a resplendent cærulean coloration of much the same shade as in *Rapala schistacea*, Moore, though of far greater extent. *Hindwing*, the anal lobe with an oval patch of deep vermilion scales, the abdominal margin pale brown and very hairy, *tail* black tipped with white. UNDERSIDE, *both wings* of a pale ochreous-brown colour, [sometimes glossed with purple.] *Forewing* with a pair of fine brown lines closing the discoidal cell; a very straight oblique discal line from the costa to the middle of the submedian interspace, this line is made up of two equal portions, inwardly of a pale brown portion, outwardly of a dark brown portion; a very indistinct submarginal fascia. *Hindwing* with a pair of very fine brown lines closing the discoidal cell; a very straight discal line as in the forewing from the costa to the first median nervule, from thence to abdominal margin forming a W-shaped figure; a submarginal fascia as in the forewing; anal lobe black crowned with whitish, inwardly marked with an orange line; a round black spot crowned with ochreous on the margin in the first median interspace, the wing-surface between it and the anal lobe sprinkled with black and white scales, a fine black marginal thread. *Cilia* reddish-brown throughout. *Body* concolorous with the wings above, pale yellow below. *Head* with the frontal tuft and *palpi* pale yellow."

"Apparently nearest to *Rapala nissa*, Kollar, with which it closely agrees in the coloration and markings of the underside, though the discal line is straighter and more even than is usually the case in that species. It differs, however, from *R. nissa* on the upperside in having the rich iridescent blue reflections which are only seen in certain lights, these being entirely absent in *R. nissa*."

"Described from a single specimen taken in Bhutan in April, in the collection of Mr. A. V. Knyvett." (*de Nicéville*, l. c.)

Mr. Otto Moller has, since this description was written, obtained this species at Tongloo, Sikkim, 10,000 feet. I have also received several males from various parts of Sikkim, where it does not appear to be very uncommon. The female is unknown, and will probably be difficult to recognise.

The figure shews both sides of the type male specimen from Bhutan in the collection of Mr. A. V. Knyvett.

995. **Rapala schistacea**, Moore.

Deudorix schistacea, Moore, Proc. Zool. Soc. Lond., 1879, p. 140; *Rapala schistacea*, de Nicéville, Journ. A. S. B., vol. liv, pt. 2, p. 48, n. 84 (1885); id., Doherty, Journ. A. S. B., vol. lv, pt. 2, p. 126, n. 129 (1886); *Deudorix varuna*, Wood-Mason and de Nicéville (*nec* Horsfield), Journ. A. S. B., vol. xlix, pt. 2, p. 234, n. 51 (1880).

HABITAT: Himalayas, N.-W. Provinces, Bengal, Assam, Orissa, Ganjam, Nilgiris, Ceylon, Andaman Isles.

EXPANSE : ♂, ♀, 1·15 to 1·50 inches.

DESCRIPTION: " MALE. UPPERSIDE, *both wings* dark slaty-blue, [the lower discal area of the forewing and the disc of the hindwing shot with brilliant blue in some lights. *Hindwing* with the abdominal margin pale fuscous, the anal lobe black, bearing inwardly a patch of dull ochreous scales, with a patch of long white hairs above the lobe, and a fine anteciliary white line, obsolete anteriorly]. UNDERSIDE, *both wings* buff-grey, crossed by a narrow discal band of two white lunular lines [filled in with dark brown], and a cell-streak ; [an indistinct submarginal fascia]. *Hindwing* with a black anal spot bordered above with white, and another beyond [in the first median interspace] bordered with ochreous, [the space between these spots irrorated with greenish metallic scales, with a narrow band of the same colour above the anal lobe]. FEMALE. UPPERSIDE, *both wings* purple-blue, borders slightly purple-brown."[1] [Otherwise as in the male, but of course lacking the blue gloss].

" Allied to *D.* [= *R.*] *varuna,* [Horsfield, a Javan species]. May be distinguished by the blue colour of the male pervading the entire surface of the upperside." (*Moore,* l. c.) The latter remark is incorrect, the blue gloss does not nearly cover the entire surface.

" Very common throughout the year in Calcutta. I have bred the larva in the Spring from *Antidesma Gaesembilla,* Mull., a deciduous bush growing in the Botanical Gardens. The larva and pupa agree exactly with the figures of an undetermined species given in Horsfield and Moore's Cat. Lep. Ins. Mus. E. I. C., pl. xii, figs. 4, 4*a*, and which is probably *Rapala varuna,* Horsfield, a Javan species." (*de Nicéville,* l. c.) The larvæ are attended at all ages by a small black ant, *Cremastogaster* sp. The larva feeds on the just opening leaves, buds and flowers of the bush, and resembles them so closely as to be very difficult to find, though it is easily obtained by beating.

" Distinguished by the beautiful blue of the hindwing and the basal part of the forewing, when seen in certain lights, especially from behind." (*Doherty,* l. c.)

The rich, though restricted, blue gloss of the upperside of the males on both wings, and the narrow discal band on the underside of both wings, at once distinguish this species from *R. orseis,* Hewitson, which occurs in so many places with it. The females of *R. schistacea,* as far as I am aware, can only be distinguished from the same sex of *R. orseis* by the discal band on the underside of both wings being narrower and more regular. It occurs on the lower outer ranges of the Himalayas as far west as Masuri at any rate, in Sikkim it is found in April, June, and October, Colonel A. M. Lang has sent me a specimen taken at Bareilly in the North Western Provinces in December, it is common at Bholahât in the Malda district, in Calcutta, probably occurs throughout Assam, and is found in Orissa and southwards to the Nilgiris, and again in the Andaman Isles. In the Indian Museum, Calcutta, is an undoubted specimen from Ceylon, which is a new locality for it.

996. **Rapala lankana,** Moore.

Deudorix lankana, Moore, Proc. Zool. Soc. Lond., 1879, p. 141 ; idem, id., Lep. Cey., vol. i, p. 103, pl. xxxix, fig. 5, *female* (1881) ; *Vadebra lankana,* id., Proc. Zool. Soc. Lond., 1883, p. 528.

HABITAT : North Kanara, Nilgiris, Ceylon.

EXPANSE : ♂, ♀, 1·5 to 1·6 inches.

DESCRIPTION : MALE. UPPERSIDE, *both wings* deep purple, almost dull black, but in certain lights the whole of the hindwing and the lower discal area of the forewing glossed with magnificent rich purple. *Hindwing* with the anal lobe centred with ferruginous. UNDERSIDE, *both wings* pale ferruginous towards the base, becoming gradually darker towards the margin. *Forewing* with a somewhat broad straight discal deep ferruginous band from the costa almost reaching the submedian nervure, its outer edge very even, its inner edge a little irregular. *Hindwing* with a similar discal band, but posteriorly curved up to the abdominal margin ; the anal lobe black, a deep ferruginous spot in the first median interpace on the margin, with some indistinct white speckles between, the discal band also bordered with white

on both sides above the anal lobe. "FEMALE. UPPERSIDE, *both wings* pale violet-brown, marginal line black. *Cilia* pale ferruginous, at anal angle of hindwing and beyond the tail white. *Hindwing* with the anal lobe ferruginous, *tail* black. UNDERSIDE, *both wings* pale ferruginous, the margin darker; crossed by a narrow ferruginous-brown discal band. *Hindwing* with a black spot at the anal lobe and a speckled spot beyond, both of which and the end of the band are bordered with white speckles. *Legs* blackish, banded with white." (*Moore*, l. c.)

I have seen males only of this species. It is very rare, Mr. Hugh Wise has taken it in North Kanara in June and July, Mr. G. F. Hampson has met with it on the southern slopes of the Nilgiris at 3,500 feet in April, and in Ceylon the type was taken by Captain Wade on the edge of high jungle in the Kottawah forest, near Galle.

997. **Rapala scintilla,** n. sp.

HABITAT: Sikkim.

EXPANSE: ♂, 1·4 to 1·6 inches.

DESCRIPTION: MALE. UPPERSIDE, *both wings* very dark indigo-blue. *Hindwing* with a patch of most magnificent iridescent blue on the disc beyond the end of the discoidal cell not quite reaching the outer margin, bounded posteriorly by the first median nervule, anteriorly extending just above the second subcostal nervule; inner margin pale fuscous heavily clothed with long fuscous setæ; anal lobe bearing a very small orange spot. UNDERSIDE, *both wings* greenish-grey; two fine darker grey lines defining the disco-cellular nervules; a similar discal line, outwardly bounded with a fine white line, slightly outwardly curved in theforewing, extending from the costa to the submedian fold, more curved and somewhat irregular in the hindwing, recurved to the abdominal margin; an obscure submarginal band. *Hindwing* with a large black spot crowned with a fine white line on the anal lobe, a smaller similar spot crowned with a fine orange line in the first median interspace, the space between these two spots sprinkled with black and white scales; a very fine anteciliary black line; *cilia* grey; *tail* black, tipped with white. FEMALE unknown.

R. scintilla in the male may at once be distinguished from *R. schistacea*, Moore, by the absence of the blue gloss on the forewing; from *R. orseis*, Hewitson, it may be known by the presence of the blue gloss on the hindwing. *R. scintilla* therefore appears to occupy a position exactly intermediate between these two species. The greenish-grey shade of the underside is also distinctive.

Described from six examples in Mr. A. V. Knyvett's collection and my own.

998. **Rapala orseis,** Hewitson.

Deudorix orseis, Hewitson, Ill. Diurn. Lep., p. 23, n. 20 (1863); id., Moore, Proc. Zool. Soc. Lond., 1877, p. 589; id., Wood-Mason and de Nicéville, Journ. A. S. B., vol. xlix, pt. 2, p. 234, n. 50 (1880); *Rapala orseis*, de Nicéville, Journ. A. S. B., vol. liv, pt. 2, p. 48, n. 85 (1885); id., Moore, Journ. Linn. Soc. Lond.; Zoology, vol. xxi, p. 43 (1886).

HABITAT: Sumatra (*Hewitson*), Singapore, Kamorta, Mergui (*Moore*), Malda, Sikkim, Calcutta, Orissa, Nilgiris, Bombay, Andaman Isles, Assam, Burma.

EXPANSE: ♂, 1·1 to 1·4; ♀, 1·3 to 1·5 inches.

DESCRIPTION: "MALE. UPPERSIDE, *both wings* dark brown, glossed with dull indigo-blue. *Forewing* with the *apex rounded*. *Hindwing* tailed, the anal lobe black, with a spot of orange-yellow. UNDERSIDE, *both wings* rufous-brown, *glossed with purple*, a large spot at the end of the cell, a transverse rufous-brown band beyond the middle (not continuous where the wings meet), nearly straight and equal on the forewing, broad and slightly broken on the hindwing and bordered on both sides with white. *Hindwing* with the caudal spot (which is crowned with orange) and the lobe black, the space between them irrorated with silvery-white, a submarginal line of white, the margin black." (*Hewitson*, l. c.) "FEMALE. UPPERSIDE, *both wings* lighter than in the male, with a distinct purple gloss which has a light steel-bluish tint at the base. UNDERSIDE, *both wings* lighter, with all the markings more distinct." (*Wood-Mason* and *de Nicéville*, l. c.)

"A single male specimen was taken by me in Calcutta in April on the flowers of *Diospyros montana*, and Major Sage took another male in December. *R. lazulina*, Moore, from Ceylon, is very closely allied to this species, but unlike Calcutta specimens is not glossed with purple on the underside, which Hewitson gives as a distinguishing character of his *R. orseis*." (*de Nicéville*, l. c.)

Mr. Otto Möller possesses numerous specimens of both sexes of this species taken in Sikkim. The male has usually a more or less prominent round space at and beyond the end of the cell of the forewing on the upperside devoid of the deep steel-blue gloss, with the veins which cross it pale. The discal band of the underside is always broader than in *R. schistacea*, Moore, and in some specimens is very broad and amalgamated with the band closing the discoidal cell of both wings in the male: it is variable also in the female, but the broadest banded specimens from Sikkim that I have seen have the discal and disco-cellular bands separated on the forewing, but run into one another on the hindwing. In Sikkim it occurs in June, November, and December. Mr. Moore has recorded this species from Kamorta in the Nicobars, but no specimen has been received from there since. It is, however, common in the Andamans. As will be seen from the localities given above, *R. orseis* has a wide range, which would be further extended if the habitats of the two species which follow were added, as I think they ought to be; neither of them being, in my opinion, distinct species.

999. **Rapala grisea**, Moore.

Deudorix grisea, Moore, Proc. Zool. Soc. Lond., 1879, p. 140; *Rapala grisea*, id., l. c., 1882, p. 251; id., Doherty, Journ. A. S. B., vol. lv, pt. 2, p. 127, n. 130 (1886).

HABITAT: Deyra Doon, Kangra district, N.-W. Himalayas (*Moore*); Kapkot, Bagheswar, Khati, 3-7,000 feet, Kumaon (*Doherty*).

EXPANSE: ♂, 1·5; ♀, 1·6 inches.

DESCRIPTION: "MALE. UPPERSIDE, *both wings* dull greyish-blue, outer border dusky black. UNDERSIDE, *both wings* dull lavender-grey, crossed by a broad darker band bordered by a pale lunular line, and a cell-streak. *Hindwing* with the anal spots black, the outer spot ochreous-bordered above. FEMALE. UPPERSIDE, *both wings* pale greyish-blue, border dusky brown."

"Allied to *D.* [=*R.*] *schistacea*, Moore." (*Moore*, l. c.)

"This species, which has the transverse band below broader than in *R. schistacea*, and the wings above dull steel-blue in all lights without the brilliant cyaneous reflections of that species, has been identified by Mr. de Nicéville as *R. orseis*, Hewitson (from Sumatra), and so named by him in his lists of the butterflies of Sikkim, Calcutta, and the Andaman Isles."

"An aberrant male and female from Jhulaghat on the western border of Nepal differ in the extreme width of the transverse band below, which is very dark, and on both wings of the male, and less perfectly in the hindwing of the female, is united with the dark disco-cellular band. I prefer not to separate this form from *R. grisea*, though it is perhaps distinct." (*Doherty*, l. c.)

The variety which Mr. Doherty describes above is one which occurs very commonly in *R. orseis*, Hewitson, and is without doubt of no specific value.

There is a single female specimen in the Indian Meseum, Calcutta, from Mr. Hocking's Kangra collection, which Mr. Moore identifies as this species. It is quite indistinguishable from other specimens he has identified as *R. orseis*, and I have but little doubt that the name should be sunk as a synonym of that species.

1000. **Rapala lazulina**, Moore.

Deudorix lazulina, Moore, Proc. Zool. Soc. Lond., 1879, p. 140; *Rapala lazulina*, id., Lep. Cey., vol. i, p. 105, pl. xl, figs. 3, 3*a*, *male* (1881).

HABITAT: Ceylon (*Moore*), Nilgiris (*Hampson*).

EXPANSE: ♂, ♀, 1·25 inches.

DESCRIPTION: "MALE. UPPERSIDE, *both wings* dull dark lazuline-blue, outer borders black. *Hindwing* with the abdominal margin grey, the anal lobe black. UNDERSIDE, *both wings* brownish-grey. *Forewing* crossed by a discal band of two narrow white lunular lines, and a short streak at the end of the cell. *Hindwing* crossed by similar irregular bands, the discal band bent upwards to the middle of the anal margin; a black spot bordered above with ochreous at the anal angle, and another beyond. FEMALE. UPPERSIDE, *both wings* purple-grey. UNDERSIDE, *both wings* ochreous-grey; marked as in the male."

"Allied to the Javan *D.* [=?*R.*] *varuna*, Horsfield, and to *D. orseis*, Hewitson, from Singapore." (*Moore*, l. c. in Proc. Zool. Soc. Lond.)

"Not uncommon on the lower slopes of the Nilgiris" (*G. F. Hampson.*)

I can find no character by which to separate this species satisfactorily from *R. orseis*. Typically the latter is glossed with purple on the underside, but this is not a specific character, and very many specimens of *R. orseis* undoubtedly lack this feature, especially females. It would be more satisfactory in describing such species as this if Mr. Moore would say how they differ from their nearest allies, the bald statement that they are allied being hardly any help to correct discrimination.

1001. **Rapala rosacea**, de N. (PLATE XXV, FIG. 151 ♂).

R. rosacea, de Nicéville, Journ. A. S. B., vol. lvii, pt. 2, p. 285, n. 15, pl. xiv, fig. 12, *male* (1888).

HABITAT: Sikkim, Khasi Hills.

EXPANSE: ♂, 1·16 to 1·56; ♀, 1·40 to 1·52 inches.

DESCRIPTION: "MALE. UPPERSIDE, *both wings* fuscous. *Forewing* glossed with shining deep steely-purple from the base to beyond the middle. *Hindwing* with all but the costa, outer margin narrowly, and abdominal margin broadly glossed with shining deep steely-purple. UNDERSIDE, *both wings* vinous-red, in some specimens the red colour somewhat obsolescent. *Forewing* with two short dark lines at the end of the cell, a discal very even slightly curved narrow dark band from the costa to the submedian fold, a submarginal obscure fascia. *Hindwing* with the disco-cellular and discal markings as in the forewing, but the latter at its posterior end assuming a W-shaped figure, the whole band outwardly narrowly defined with white, at its posterior end also inwardly defined with white, the anal lobe marked with red in the middle, a red spot on the margin beyond the base of the tail, between which the wing is irrorated with grey scales, a narrow red line running up from the anal lobe to the abdominal margin below the discal line. *Cilia* reddish-brown throughout. *Tail* black, tipped with white. FEMALE coloured and marked exactly like the male, but of course lacking the male secondary sexual characters."

"Mr. Otto Möller possesses five males and six females of this distinct species, all taken in Sikkim in March. The reddish-vinous coloration of the underside at once distinguishes it from all the species of the genus known to me." (*de Nicéville*, l. c.) The Rev. Walter A. Hamilton has obtained several specimens of this species in the Khasi Hills in the Spring. It is just possible that *R. rosacea* may be a seasonal (Spring) form of *R. nissa*, Kollar, occurring in Sikkim and the Khasias, though I have seen no specimens connecting the two species.

The figure shews both sides of a male specimen from Sikkim in my collection.

1002. **Rapala nissa**, Kollar.

Thecla nissa, Kollar, Hügel's Kaschmir, vol. iv, pt. 2, p. 412, n. 2, pl. iv, figs. 3, 4 (1848); *Amblypodia nissa*, Horsfield and Moore, Cat. Lep. Mus. E. I. C., vol. i, p. 46, n. 73 (1857); *Deudorix nissa*, var. (part), Hewitson, Ill. Diurn. Lep., p. 23, n. 19, pl. x, figs. 42, 43, *male* (*nec* 44) (1863); *Bidaspa nissa*, Moore, Proc. Zool. Soc. Lond., 1882, p. 250; id., Doherty, Journ. A. S. B., vol. lv, pt. 2, p. 126, n. 128 (1886); *Rapala nissa*, Butler, Proc. Zool. Soc. Lond., 1886, p. 370, n. 56.

HABITAT: Himalayas, Assam, Sumatra.

EXPANSE: ♂, ♀, 1·3 to 1·8 inches.

DESCRIPTION: "UPPERSIDE, *both wings* fuscous irrorated with violet. *Hindwing* with one tail, with a brown ocellus sprinkled with white at the anal angle. UNDERSIDE, *both wings*

yellowish-grey, with a slender darker line, posteriorly undulated. *Hindwing* with two black ocelli, the second marked with red." (*Kollar*, l. c.)

MALE. UPPERSIDE, *both wings* shining bluish-purple or deep steel-blue, variable in shade. *Forewing* with the costa, apex and outer margin purplish-black, sometimes without any other marks, sometimes with a small orange patch beyond the cell, sometimes with a patch nearly as large as in *Hysudra selira*, Moore. *Hindwing* with the costal margin pale, the abdominal margin fuscous, the anal lobe black, with a patch of ferruginous scales near the middle. UNDERSIDE, *both wings* with the ground-colour somewhat variable in tone, sometimes pale brown, sometimes ochreous-brown. *Forewing* with two fine dark lines defining the disco-cellular nervules ; a very straight, even, decreasing discal band from the costa almost to the submedian nervure, outwardly finely defined with white ; an obscure submarginal fascia. *Hindwing* with similar markings, but the discal band recurved to the abdominal margin, where it is defined on both sides with white ; anal lobe black, submedian interspace on the margin also black, but heavily sprinkled with whitish scales, a black spot crowned with orange in the first median interspace. FEMALE. UPPERSIDE, *both wings* rather duller in shade, otherwise similar to the male.

"A variable species. The male is sometimes, as in Kollar's figure, without the red spot on the middle of the forewing ; sometimes it is more distinctly marked than in the figure 42 of the plate. In colour it differs from other allied species, and, like the females of *R. varuna*, Horsfield, and *R. pheretima*, Hewitson, [a Bornean species], is of a dull grey- or indigo-blue. On the underside the transverse band is far apart where the wings meet." (*Hewitson*, l. c.)

In Sikkim, as elsewhere, this is a very variable species, some specimens of both sexes showing no trace of the discal orange spot on the upperside of the forewing, others having it quite small, while others again have it very large. It occurs in Sikkim in March, April, May, August, September, and October.

Mr. Doherty (l. c.) remarks :—"Kumaon specimens rarely show any trace of the red spot above, and are of a richer metallic above and a deeper rufous below than Simla specimens. The genus [*Bidaspa*] seems very close to *Rapala*." Colonel Lang writes of this species :— "Scarce or local at Naini Tal, a few taken in May, July, and September, 4,000 to 6,500 feet. Generally shot with steely-blue without any patch, but one or two with a dull fulverescent patch."

R. nissa is probably confined to mountainous districts, and where it occurs is by no means rare. It has so far not been recorded from the Malay Peninsula, but the hill ranges in that region have been very slightly explored entomologically. I possess two specimens from Sumatra which only differ from Indian examples in the discal band on the underside of both wings being filled in with ochreous. Mr. Butler evidently does not admit the generic distinctness of *Bidaspa*, as in 1886 he quite correctly places this species in the genus *Rapala*.

1003. **Rapala rectivitta**, Moore.

Deudorix rectivitta, Moore, Proc. Zool. Soc. Lond., 1879, p. 141.

HABITAT : N. Cachar.

EXPANSE : ♂, 1·5 inches.

DESCRIPTION : "MALE. UPPERSIDE, *both wings* dark dusky blue borders black. UNDERSIDE, *both wings* pale vinous brownish-buff, crossed by a straight narrow tapering dark brown pale-outer-bordered band, a paler cell-streak, and an indistinct brownish submarginal fascia ; the band on the *hindwing* bent and zigzag above the anal angle ; a small black anal and subanal spot speckled ochreous and white, a few speckles also between them."

"Nearest allied to *D.* [=*R.*] *nissa*, Kollar, from the N.-W. Himalayas." (*Moore*, l. c.)

I have not seen this species. In many respects the description agrees with my *R. tara*, but the anal lobe and black spot beyond in that species are not "speckled ochreous and white,"

being entirely jet black. The description also answers to *R. nissa* except the character given above as distinguishing it from *R. tara*.

1004. **Rapala petosiris**, Hewitson.

Deudorix petosiris, Hewitson, Ill. Diurn. Lep., p. 22, n. 13, pl. ix, figs. 30, 31, *male* (1863); *Vadebra petosiris*, Moore, Proc. Zool. Soc. Lond., 1883, p. 528; *V. pheretima*, Moore (*nec* Hewitson), Journ. Linn. Soc. Lond., Zoology, vol. xxi, p. 43 (1886).

HABITAT: East India (*Hewitson*), Sikkim, Cachar, Sylhet, Orissa, Burma.

EXPANSE: ♂, ♀, 1·4 to 1·8 inches.

DESCRIPTION: "MALE. UPPERSIDE, *both wings* rufous. *Forewing* with the costal margin and apex broadly brown. *Hindwing* tailed. UNDERSIDE, *both wings* with two rufous-brown spots before the middle, crossed beyond the middle by a nearly straight rufous-brown band, and by an indistinct submarginal band of the same colour. *Hindwing* with the caudal spot and anal lobe dark brown, a submarginal white line near the tails. FEMALE. UPPERSIDE, *both wings* brown, slightly glossed with dull blue. UNDERSIDE, *hindwing* differs from the male only in having the transverse band bordered below and near the inner margin on both sides with white." (*Hewitson*, l. c.)

In the male on the upperside the forewing is rufous, with the costa broadly, the apex still more broadly, the outer margin decreasingly (terminating in a point at the anal angle), black. Hindwing entirely rufous except the costal and abdominal margins which are pale fuscous, and a narrow black anteciliary thread; the anal lobe rufous-ochreous, with a fine outer white line reaching the base of the tail, the latter is black tipped with white. The underside of both wings is brown. Forewing with a blackish spot crossing the discoidal cell at its middle, two fine lines on the disco-cellular nervules, a gently curved discal line from the costa almost to the submedian nervure, and an indistinct submarginal fascia. Hindwing with a rounded spot placed on the raised glandular patch below the costa (in the male only of course, this spot being invariably absent in the female), two narrow disco-cellular lines, a discal irregular fascia posteriorly curved upwards to the abdominal margin, where it is defined with a very narrow white line on both sides, an obscure ochreous submarginal rather broad fascia, anal lobe jet black, a small black spot on the margin in the first median interspace, with a few scattered silvery scales between it and the anal lobe, and continued to the abdominal margin above the lobe. The female on the upperside is glossed with dull steel-blue, which colour merges into the blackish outer margins of the wings.

R. petosiris is a fairly common species at low elevations in Sikkim; Mr. Otto Möller possesses specimens caught in August, October, November, and December. It occurs rarely in the hills of Orissa, also throughout Assam and in Burma. It is a very variable species, in specimens from a single locality such as Sikkim I find that the basal spots on the underside of both wings in both sexes are often entirely wanting, and that they are sometimes present though very small.

Three other species of this group have been recorded from the Malay Peninsula. *R. pheretima*, Hewitson, may be known from its near ally *R. petosiris*, Hewitson, by the male on the upperside having the rufous colour much restricted, confined to the disc of both wings, leaving all the margins broadly black. Mr. Moore has recorded this species from the Mergui Archipelago, but the specimens are now before me, and are quite typical *R. petosiris*, which is very distinct from typical *R. pheretima*. The latter is typically a Bornean species, but a slight variety of it was described by Hewitson from Singapore. Mr. Moore also gives Tounghoo, Burma, as another locality for it. *R. sequeira*, Distant, and *R. utimutis*, Distant, may perhaps be known from *R. petosiris*, the former by having the discal band on the underside of the hindwing strongly dislocated, the band on the forewing more curved; the latter by having the discal band of the forewing sinuous, much bowed outwardly in the middle and reaching the submedian nervure, very broad and prominent on the hindwing. As the spots on the underside

are so variable in *R. petosiris*, I do not think they will prove of much specific value in other species of this group of the genus. A description of all these species is appended.*

1005. **Rapala suffusa**, Moore.

Deudorix suffusa, Moore, Proc. Zool. Soc. Lond., 1878, p. 834, pl. lii, fig. 8, *male*; *Vadebra suffusa*, id., l. c., 1883, p. 528.

HABITAT: Sylhet, Burma.

EXPANSE: ♂, ♀, 1·35 to 1·45 inches.

DESCRIPTION: MALE. UPPERSIDE, *both wings* dull coppery-brown, much as in the male of the common *Rapala petosiris*, Hewitson, but a little paler. *Forewing* beautifully suffused in certain lights with rich purple, especially on the black portions of the wing; the costa and outer margin about equally broadly, the apex still more broadly black, the inner edge of the outer black border irregular, projected inwards in the submedian interspace and below the submedian nervure; the veins crossing the coppery-brown area narrowly black. *Hindwing*

* *Rapala pheretima*, Hewitson. *Deudorix pheretima*, Hewitson, Ill. Diurn. Lep., p. 21, n. 12, pl. ix, figs. 28, 29, *male*; 27, *female* (1863); *Vadebra pheretima*, Moore, Proc. Zool. Soc. Lond., 1883, p. 528. HABITAT: Singapore; Sumatra; Sarawak, Borneo. EXPANSE: 1·7 inches. DESCRIPTION: "MALE. UPPERSIDE, *both wings* rufous-brown, tbe middle rufous. *Hindwing* tailed. UNDERSIDE, *both wings* rufous-brown, crossed beyond the middle by a band of brown, slightly undulated on the forewing and bordered *outwardly with white*, broken into spots on the hindwing and bordered on *both sides with white*; with an indistinct band of brown near the outer margin. *Forewing* with two large spots before the middle. *Hindwing* with two or three spots; the caudal spot, tbe lobe, and a large spot between them, which is irrorated with silvery blue, all black; a silver spot above the lobe. FEMALE. UPPERSIDE, *both wings* rufous-brown, glossed witb blue. UNDERSIDE does not differ from tbe male, except that tbe spots of tbe *hindwing* are smaller and of a somewhat different form."

"Variety from Singapore. MALE. UNDERSIDE, *both wings* with the transverse band narrower, straigbter, the spot nearest the costal margin of the *hindwing* linear." (*Hewitson*, l. c.)

With regard to this last paragraph, if the specimen described has tbe rufous colouring confined to a discal patch on the upperside of both wings it is abundantly distinct from *R. petosiris*. The species has not been included by Mr. Distant in his "Rhopalocera Malayana." It has been recorded as stated above from Burma, but I think erroneously.

Rapala sequeira, Distant. *Deudorix sequeira*, Distant, Rhop. Malay., p. 278, n. 2, pl. xxiii, fig. 21, *female* (1885); *D. petosiris*, Butler (*nec* Hewitson), Trans. Linn. Soc. Lond., Zoology, second series, vol. i, p. 549, n. 1 (1877). HABITAT: Malacca. EXPANSE: *Female*, 1·5 inches. DESCRIPTION: "FEMALE. UPPERSIDE, *both wings* violaceous-blue, the margins obscurely fuscous. *Hindwing* with a black spot on the anal lobe. UNDERSIDE, *both wings* pale brownish. *Forewing* with a disco-cellular fascia outwardly margined with greyish at the end of the cell; a narrow waved dark fascia outwardly margined with greyish between the end of the cell and the outer margin, and a fuscous marginal and submarginal fascia. *Hindwing* with a transverse dark fascia bordered with greyish at the end of tbe cell; a narrow and strongly dislocated fascia outwardly bordered with greyish (dislocated at the nervules from the costa to tbe second median nervule and tben continuous and broader to the abdominal margin) crossing the wing between the end of the cell and the posterior margin; a marginal and submarginal fascia as on the forewing, a black marginal spot surrounded witb greenish scales between the second and first median nervules, a patch of greenish scales between the first median nervule and the submedian nervure, a black spot on tbe anal lobe, and two small fuscous spots beneath the costal nervure."

"The female specimen captured in Malacca by Capt. Pinwill, and presented to the British Museum, was identified in error by Mr. Butler as *D. petosiris*, Hewitson; a species, however, from which *D. sequeira* differs by the distinct markings on tbe underside of the wings, such as the absence of the transverse spot in the cell of tbe forewing [this spot is often absent in true *R. petosiris*], and by the strongly dislocated transverse fascia to the hindwing, &c. The male has still to be discovered, and will doubtless prove to have the wings above of some shade of rufous-brown. My collection contains a Burmese example of the true *D. petosiris*, which perfectly agrees with Hewitson's figure." (*Distant*, l. c.) This last note is interesting, as it confirms my own opinion that *R. petosiris* occurs typically in Burma.

Rapala utimutis, Distant. *Deudorix utimutis*, Distant, Rhop. Malay., p. 279, n. 3, pl. xxiii, fig. 22, *male* (1885); *D. pheretima*, Butler (*nec* Hewitson), Trans. Linn. Soc. Lond., second series, Zoology, vol. i, p. 549, n. 2 (1877). HABITAT: Penang, Malacca. EXPANSE: *Male* and *female*, 1·6 inches. DESCRIPTION: "MALE. UPPERSIDE, *both wings* dark rufous. [It is strange that this species should not have an outer black border more or less wide as in *R. petosiris* and *R. pheretima*]. *Hindwing* with a black spot on the anal lobe. UNDERSIDE, *both wings* pale brownish, witb a transverse dark brown spot margined with greyish, in and at the end of the discoidal cells of both wings; followed between the ends of the cells and the outer margins by a narrow transverse dark brown fascia outwardly margined with greyish, which on the hindwing is strongly dislocated and sinuated from tbe third median nervule to the abdominal margin, where it is considerably widened; an obscure submarginal fascia to both wings, and three marginal spots to the hindwing near the anal angle, the first and third black, and the middle one composed of greenish scales; extreme outer margin narrowly paler, the *cilia* dark. FEMALE. UPPERSIDE, *both wings* pale bluish, tbe margins irregularly pale fuscous. UNDERSIDE, *both wings* as in the male."

"A male specimen in tbe British Museum captured by Capt Pinwill in Malacca, and a female Penang specimen in my own collection, are the materials which have induced the description of this species. Though Mr. Butler included it in his list of the Malaccan butterflies as *D. pheretima*, he now quite agrees with tbe writer as to its perfect distinctness from that species, as a reference to Hewitson's figure will testify. *D. pheretima*, Hewitson (a Bornean species), not only has the spots and fasciæ on the underside of the wings of a larger character than in *D. utimutis*, but also possesses a large spot above the cell of the hindwing." (*Distant*, l. c.) Before tbese two species of Mr. Distant's can be said to be firmly established as distinct from *D. pheretima*, it will probably be necessary to examine a much larger series of each than he had to deal with.

with the base a little dusky, the abdominal margin interiorly pale, outwardly dusky, a fine black anteciliary thread, the anal lobe black, the middle occupied by a clump of dull chrome-yellow scales. UNDERSIDE, *both wings* dull chrome-yellow. *Forewing* with the disco-cellular nervules faintly defined on both sides by a pale brown fine line, a discal inconspicuous curved fine pale brown line from near the costa to near the submedian nervure. *Hindwing* with a similar line but springing from the costa, at its lower end recurved to the abdominal margin, where it is finely bordered on both sides with white; a small round black spot on the margin in the first median interspace, the anal lobe black, an anteciliary fine black line at the anal angle, becoming brown above the black spot and so continued to the apex of the forewing. FEMALE. UPPERSIDE, *both wings* somewhat shining fuscous much as in the same sex of the common *Deudorix epijarbas*, Moore. *Forewing* with the apex and outer margin of a more saturated tint. UNDERSIDE, *both wings* of a clearer yellow than in the male, all the markings, the black spot and anal lobe on the hindwing, less prominent.

R. suffusa is nearest to *R. jarbas*, Fabricius,* from which the male differs on the upperside in the colour of the ground, in the black borders of the forewing being broader, especially at the anal angle, where the border is very broad, while in *R. jarbas* at the same part it is reduced to a point, in the anal lobe being also black with a clump of chrome-yellow scales in the middle, instead of ochreous-scarlet bearing outwardly a small black spot. The female is quite distinct from that of *R. jarbas*, but is very near to that of *R. xenophon*, from which it may perhaps be known by its brighter yellow colour on the underside, by the area between the black spot and anal lobe on the hindwing being hardly sprinkled with metallic-bluish scales, and by all the markings being obscure, almost obsolete, instead of prominent.

Described from two males and a female obtained by the Rev. Walter A. Hamilton in Sylhet, and another pair in the Phayre Museum, Rangoon, the male taken at Palone, Burma, in June, 1887, the female at Rangoon in January, 1887. I append Mr. Moore's short original description of this species as a foot-note.† I think it not at all improbable that the *Deudorix barthema* of Distant will prove to be a synonym of this rare species.

1006. **Rapala melampus**, Cramer.

Papilio melampus, Cramer, Pap. Ex., vol. iv, p. 142, pl. ccclxii, figs. G, H, *male* (1781); *Baspa melampus*, Moore, Proc. Zool. Soc. Lond., 1882, p. 250; id., Swinhoe, Proc. Zool. Soc. Lond., 1885, p. 135, n. 82; idem, id., l. c., 1886, p. 429, n. 63; *Deudorix melampus*, Butler, Proc. Zool. Soc. Lond., 1883, p. 147, n. 10; *Thecla sorya*, Kollar, Hügel's Kaschmir, vol. iv, pt. 2, p. 414. n. 5, pl. v, figs. 1, 2, *male* (1848).

HABITAT: Coromandel Coast (*Cramer*); Ceylon, almost throughout India (except the desert tracts, Sikkim, Assam and Burma), Nias Island, Sumatra.

EXPANSE: ♂, ♀, 1·3 to 1·6 inches.

DESCRIPTION: MALE. UPPERSIDE, *both wings* scarlet. *Forewing* with the costa widely the apex broadly, and the outer margin decreasingly black, *the black border* on the outer margin *not ending in a point* as it does in *R. jarbas*, Fabricius, being as much as one-twelfth of an inch in breadth at the anal angle; the veins black, *the median nervules and the outer portion of the median nervure not bordered with black* as in *R. jarbas*. *Hindwing* with the costa dusky, the abdominal margin pale, a fine anteciliary thread on the outer margin, *the anal lobe black, bearing anteriorly towards the abdominal margin a patch of ochreous scales, and outwardly a few scattered metallic greenish ones*; the anal lobe in *R. jarbas* being ochreous-scarlet, and bearing outwardly a small black spot, but no ochreous or green scales. UNDERSIDE, *both wings* pale purplish-brownish. *Forewing* with the inner margin paler, a double narrow darker line

* I possess two male specimens of *R. jarbas*, Fabricius, from Sikkim which are distinctly fulvous instead of vermilion-red on the upperside, but they are obviously aberrations only.

† "Allied to *Deudorix* [=*Rapala*] *xenophon*, Fabricius, male. MALE. Wings slightly broader. UPPERSIDE, *forewing* with a broader outer band, the red colour suffused with dusky brown. *Hindwing* also duller red, UNDERSIDE, *both wings* dull sulphur-yellow; transverse lunular line more curved. *Hindwing* with the zig-zag end of the transverse lunular line at the anal angle black, and with an additional similar line above its end." (*Moore*, l. c.) The type specimens were taken by Mr. Ossian Limborg at Taoo, Upper Tenasserim, at 3-5,000 feet elevation.

on either side of the disco-cellular nervules, a curved narrow discal line, almost reaching the costa, ending on the submedian nervure, outwardly defined with whitish ; an obsolete macular submarginal fascia. *Hindwing* with the disco-cellular and discal markings as in the forewing, but the latter recurved to the abdominal margin, where it is inwardly defined by a fine white line ; the anal lobe jet black, the round marginal spot in the first median interspace also jet black, and narrowly crowned with pale ochreous, the submedian interspace on the margin also black but thickly irrorated with greenish scales. FEMALE. UPPERSIDE, *both wings* much duller, more brick red than in the male, especially on the *hindwing*, where the costa and outer margins are distinctly suffused with dusky. UNDERSIDE, *both wings* as in the male.

A comparative description of this species has never before been given. As it is very near to *R. jarbas*, I have italicised those portions of the description of the male in which I have pointed out how it differs from that species. The females of the two species are easily distinguished, as in *R. jarbas* the upperside is entirely cupreous-brown, and in *R. melampus* dull red. Although Mr. Moore described the genus *Bāspa* in which he places this species, he does not seem to have quite grasped its peculiarities, as he writes to me that the male has no secondary sexual characters, and has identified as *Nadisepa jarbas* a male of *Baspa melampus*, and as a male of *B. melampus* that which is clearly a female. The only authority for the species is Cramer's figure, in which the sinuosity of the costa of the forewing is shown in a somewhat exaggerated manner, and the inner margin as slightly dusky, which is not correct. In other respects the figure is a good one. Horsfield was led away by the inner margin of the forewing of Cramer's figure being shown dusky to place *melampus* as a synonym of *xenophon*, Fabricius, but in this he is clearly wrong, as the figure in question shows the hindwing to be entirely red at the base, while in *xenophon* it is broadly black.

R. melampus does not appear to be a common species anywhere. It occurs in the Western Himalayas on the lower outer ranges, but strangely enough not in Sikkim, where it is replaced by *R. jarbas*. It occurs almost throughout the plains of India, from Calcutta to Bombay and southwards to Travancore ; and Mr. Fairlie obtained a single male in July at Jaffna in Ceylon, which is a new locality for it. It does not occur in the arid plains of Sind and Rajputana, nor, as far as I know, in Assam or Burma. Herr N. M. Kheil records it from Nias Island,* and Herr P. C. T. Snellen from Sumatra†.

1007. **Rapala jarbas,** Fabricius.

Papilio iarbus, Fabricius, Mant. Ins., vol. ii, p. 68, n. 648 (1787) ; *Hesperia jarbas*, id., Ent. Syst., vol. iii, pt. 1, p. 276, n. 65 (1793) ; *Papilio jarbas*, Donovan, Ins. Ind., pl. xl, fig. 3, *male* (1800) ; *Polyommatus jarbas*, Godart, Enc. Méth., vol. ix, p. 646, n. 108 (1823) ; *Thecla jarbas*, Horsfield, Cat. Lep. E. I. C., p. 93, n. 26, pl. iv, figs. 2, *larva* ; 2*a*, *pupa* ; 2 *b-e*, *structure of imago* (1829) ; *Nadisepa jarbas*, Moore, Proc. Zool. Soc. Lond., 1882, p. 249 ; idem, id., Journ. Linn. Soc. Lond., Zoology, vol. xxi, p. 43 (1886) ; *Deudorix jarbas*, Distant, Rhop. Malay., p. 278, n. 1, pl. xxiv, fig. 15, *male* ; pl. xx, fig. 26, *female* (1885) ; *Dipsas melampus*, Horsfield and Moore (*nec* Cramer), Cat. Lep. Mus. E. I. C., vol. i, p. 32, n. 39, pl. i, figs. 2, *larva* ; 2*a*, *pupa* (1857) ; *Deudorix melampus*, Butler, Cat. Fab. Lep. B. M., p. 181, n. 5 (1869).

HABITAT : Siam (*Fabricius*), N.-W. Himalayas, Mergui (*Moore*), Sikkim, Bhutan, Assam, Burma, Malay Peninsula.

EXPANSE : ♂, ♀, 1·3 to 1·6 inches.

DESCRIPTION : " MALE. UPPERSIDE, *both wings* brilliant reddish-brown, inclining to scarlet. *Forewing* with broad blackish-brown borders, more diffused towards the tip and the costal portion of the base, gradually diminishing in breadth towards the inner apical angle ; medial nervures black and prominent. *Hindwing* narrow and lengthened, the ground-colour being uniformly diffused over the whole surface to a very narrow black marginal thread ; anal appendage tipt externally with black, and surrounded, within the brown *cilia*, by a white thread extending also towards the tail. UNDERSIDE, *both wings* satin-gray, with a faint glaucous cast, varying in intensity of tint in different individuals ; on the disc stands a short

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* Rhop. Ins. Nias, p 33, n. 117 (1884).

† Midden-Sumatra, Lep., p. 21.

oblong double streak consisting of two parallel grayish-brown lituræ with a medial and two lateral narrow white lines ; between this and the posterior margin a more saturated brown band pervades both wings, being nearly regular until it reaches the anal region [of the hindwing], where, after a sudden flexure, it stretches directly across towards the internal margin, being bordered with a white striga exteriorly in the forewing and on both sides in the hindwing, the tint becoming more intense as the band approaches the anal region, having a bright silvery lustre in well-preserved specimens ; the extreme anal angle is ornamented with two regularly round deep black ocellate spots, the exterior one being bordered internally with a brilliant orange lunule, the interior one, somewhat larger in size, covering the anal appendage, and being surrounded by a delicate white ring ciliated posteriorly ; the intermediate space is occupied by a roundish group of greenish silvery atoms, bedded on a blackish patch, which sends off obliquely a narrow streak towards the inner margin. *Body* testaceous-brown above, gray underneath, and covered on both sides with delicate silky hairs ; *antennæ* annulated, the club has a ferruginous tip ; *tail* black with a whitish extremity. FEMALE. UPPERSIDE, *both wings* saturated testaceous with a slight cupreous lustre, the colour being uniformly diffused over the surface, increasing in strength towards the margins, but without defined borders."

"*Thecla* [= *Rapala*] *jarbas* is at least one-fifth larger than [*R.*] *xenophon*, Fabricius, the longitudinal extent is also proportionally greater, and the general outline of the surface of the expanded insect is more regularly triangular ; the ground-colour of the upperside, in the male, inclines to fulvous, the exterior and posterior borders alone are brown, and the latter decreases gradually in breadth to the inner apical angle ; the hindwing is entirely without any black discoloration towards the base ; in the female a saturated testaceous tint, with a slight cast of metallic yellow, extends uniformly over the surface, with a very gradual increase of strength towards the margins. Several minute peculiarities of the underside in each species have been detailed in the preceding descriptions ; and here I have only to note the brilliant orange lunule over the exterior anal ocellus, which affords a permanent characteristic distinction of [*R.*] *jarbas*. In [*R.*] *xenophon* the forewing is slightly rounded at the external apical angle ; the exterior margin has a very slight sinuosity, and the general contour is somewhat broader than in [*R.*] *jarbas* ; the ground-colour of both wings on the upperside [in *R. xenophon*] is more saturated, with less of a fulvous shade ; the forewing is enclosed with borders on all sides, the interior, as well as the exterior and posterior border is dark brown ; the borders generally are broader, have a deeper tint, and the exterior costal projection is more prominent ; the hindwing has a large black spot in the middle of the exterior margin, extending to the base, and gradually diffusing itself over the veins ; on the underside the exterior ocellus is comparatively small, obsolete, oblong, or irregularly defined, bedded in a circular ring of the marginal band, but never provided interiorly with a fulvous arch : the female has above an uniform deep blackish-brown colour without any yellowish shade." (*Horsfield*, l. c.)

LARVA ochreous, considerably marked with black, ornamented with a subdorsal and a lateral series of tubercles bearing thick brushes of short black bristly hairs ; the head conspicuous, all the segments of nearly equal width, the larva flattened, the constrictions between the segments not very prominent. PUPA brownish-ochreous sprinkled with black dots, smooth, naked, of the usual lycænid shape, the head rounded, the thorax slightly humped in the middle, the abdomen ending in a sharp point. These descriptions are drawn up from Dr. Horsfield's figures of the transformations of this species as exhibited in Java, and given in the Cat. Lep. Mus. E. I. C.

"*Papilio* [*Rapala*] *jarbus* differs from the typical *P.* [*R.*] *melampus*, Cramer, in having blackened veins to the forewing ; Donovan's figure is not characteristic." (*Butler*, l. c.)

Mr. Moore records this species from the N.-W. Himalayas. This is almost certainly incorrect, no specimen from that region having been seen by me ; if correct, it is the only locality where *R. jarbas* and *R. melampus* occur together. *R. jarbas* is found commonly in Sikkim, both in the lower hills and in the Tarai, Mr. Otto Möller possessing specimens taken in July, October

to December. It occurs apparently throughout Assam, and thence southwards through Burma to Singapore and again in Java, and is a common species where met with.

1008. **Rapala xenophon**, Fabricius.

Hesperia xenophon, Fabricius, Ent. Syst., vol. iii, pt. 1, p. 272, n. 47 (1793); *Polyommatus xenophon*, Godart, Enc. Méth., vol. ix, p. 640, n. 85 (1823); *Thecla xenophon*, Horsfield, Cat. Lep. E. I. C., p. 94, n. 27 (1829); *Dipsas xenophon*, Horsfield and Moore, Cat. Lep. Mus. E. I. C., vol. i, p. 31, n. 38, pl. 1, figs. 3, *larva*; 3*a*, *pupa* (1857); *Nadisepa xenophon*, Moore, Journ. Linn. Soc. Lond., Zoology, vol. xxi, p. 43 (1885); *Deudorix xenophon*, Distant, Rhop. Malay., p. 465, n. 7, pl. xliv, figs. 1, *male*; 2, *female* (1886); *D. diencces*, Hewitson, (male only), Ill. Diurn. Lep., Suppl., p. 31, n. 35, pl. Suppl. v*a*, figs. 65, 67, *male* (*nec* 66, *female*) (1878); *Deudorix epijarbas*, Staudinger, var. *intermedius*, Staudinger, Ex. Schmett, p. 279 (1888).

HABITAT: Calcutta, Sylhet, Cachar, Burma, Malay Peninsula, Andaman Isles, Nias Island, Sumatra, Java.

EXPANSE: ♂, ♀, 1·1 to 1·5 inches.

DESCRIPTION: "MALE. UPPERSIDE, *both wings* deep fulvous inclining to red; near the middle the exterior border has a sudden angular projection, from which the borders continue broader to the base. *Forewing* with broad black borders on all the margins. *Hindwing* with very narrow black marginal threads exteriorly and posteriorly, and the nervures, in general, of the same colour; the anal region has in both sexes, within the extreme blackish boundary, a white thread, which encloses the anal appendage. UNDERSIDE, *both wings* grayish-brown with a slight cupreous reflexion, the disc marked with a short oblique white streak, delicately bordered with brown, and intermediate between this and the posterior margin is a saturated reddish-brown striga, being nearly straight in the forewing, and slightly interrupted in the hindwing, until it approaches the anal region, where it makes a sudden curve, becomes flexuose, and terminates near the middle of the interior margin; it has a faint exterior edge of white, which, in the hindwing, increases in intensity to the anal region, where it is of a brilliant satin white, and accompanied by a parallel interior striga of the same colour. *Hindwing*, anal appendage entirely covered by a round black spot; an oblong spot of the same colour extends exteriorly of the tail, in a marginal band of a more saturated tint than the ground-colour, surrounded by a ferruginous ring, but without a distinct iris; a round group of white atoms occupies the space between this and the anal appendage; a brilliant white thread, commencing near the middle of the posterior margin, winds along the anal region and appendage, being edged by the extreme brown *cilia*. *Body* covered with long delicate hairs, which are ferruginous-brown above and grayish underneath; *legs* banded alternately white and black; *tail* black, tipt with white; *eyes* with a pronounced white edge posteriorly; *antennæ* annulated with white, the club being tipt with brown. FEMALE. UPPERSIDE, *both wings* uniformly deep brown." Otherwise as in the male.

"LARVA varies at different periods in colour from yellow with a greenish cast, to dark ferruginous-brown, and at one period the lateral bands are very obscure. Feeds on *Schmiedelia racemosa*." (*Horsfield*, l. c.) Head rather large, segments increasing in size from the second to the fifth, thence to anal segment of equal size, with a subdorsal and lateral row of short tubercles bearing clumps of short closely-set bristly hairs; the body just above the legs fringed with hairs; there is a narrow black dorsal line, the segments blotched with black, a subdorsal reddish band. PUPA very rounded, the head and anal segment bluntly pointed, brown sprinkled with darker brown and reddish marks. Description drawn up from the figures in the Cat. Lep. Mus. E. I. C. from drawings made by Dr. Horsfield in Java. The larva and pupa of *R. xenophon* are very similar to those of *R. jarbas*.

There should be no difficulty in recognising the male of this species, the forewing having the veins red where they cross the red area, not black as in *R. jarbas*, Fabricius, the inner margin being broadly black, and the base also in the hindwing being broadly black. The female is dull brown, not strongly tinted with cupreous on the upperside, as in *R. jarbas*. On the

underside the ground-colour in the male has a slight cupreous reflection, or is distinctly yellow, not dull grey, as in *R. jarbas* ; the female is of somewhat varying shades of brownish-yellow.

I find that in the large series of specimens of this species which I possess the extent of the red area on the upperside of both wings is considerably variable, the red area in one extreme being twice as large as in the other; I have therefore no hesitation in placing the male of the *Deudorix dieneces* of Hewitson as a synonym of *R. xenophon*, all Hewitson says of it being that it differs "in the position of the red portion of the wing." The female of Hewitson's *D. dieneces* appears to be quite different, and not believing it to be the opposite sex of his male, I propose to restrict the name *dieneces* to the female only. Mr. Distant does not mention *R. dieneces* at all in his "Rhopalocera Malayana," though it was described from Singapore. I append its description.*

R. xenophon is a rather rare species in Calcutta : I have taken it in the winter only on the flowers of *Poinsettia pulcherrima*. It does not appear to be common anywhere, though the late Mr. R. de Roepstorff sent a good many specimens from the Andaman Isles.

Rapala domitia, Hewitson, recorded from Malacca, Singapore, Sumatra, and Borneo, is a very curious species. The male on the upperside has very much the colouring of the same side of the female of *Deudorix epijarbas*, Moore, with which also it more nearly agrees in the outline of the wings than with any species of the genus *Rapala* in which I have placed it. On the underside, however, it is totally different, being bright gamboge-yellow, with the forewing marked by three prominent black spots only, the hindwing having some deep black and metallic green markings towards the anal angle. The secondary sexual characters consist of a tuft of black hairs on the inner margin of the forewing towards the base, turned under and upwards, and lying across a very large highly polished area extending from the inner margin to the first median nervule, and the usual "scale-mark" of the genus *Rapala* above the subcostal nervure of the hindwing, which patch of scales is however narrower than in any other species of the genus I have examined. The description of the species is appended.†

Genus 173.—BINDAHARA, Moore. (PLATE XXIX).

Bindahara, Moore, Lep. Cey., vol. i, p. 111 (1881); id., Distant, Rhop. Malay., p. 247 (1884).

"FOREWING, short, triangular ; *costa* much arched at the base, *exterior margin* oblique, *posterior* margin convex in the middle and furnished beneath with a tuft of hair [in the male ; in the female the inner margin is straight, and there is no tuft of hair] ; *first subcostal nervule* emitted at nearly one-half, *second* subcostal at one-fifth, and *third* subcostal just before the end of the discoidal cell, *fourth* subcostal at one-third from below the third, *fifth* subcostal from the

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* *Rapala dieneces*, Hewitson. *Deudorix dieneces*, Hewitson, Ill. Diurn. Lep., Suppl., p. 31, n. 35 (*female* only), pl. Suppl. v*a*, fig. 66, *female* (*nec* figs. 65, 67, *male*) (1878). HABITAT : Singapore. EXPANSE : *Female*, 1·3 inches. DESCRIPTION : "FEMALE. UPPERSIDE, *both wings* rufous-brown, the costa slightly rufous. UNDERSIDE, *both wings* grey-white, crossed beyond the middle by a dark brown linear band bordered outwardly with white, also crossed by pale brown submarginal bands. *Hindwing* with the outer band broken into spots, the caudal spot (which is large) and the lobe black." (*Hewitson*, l. c.)

My reasons for thinking that that which Mr. Hewitson believed to be the female of his *dieneces* cannot be the opposite sex of his species are these :—In the female be does not describe or figure the two short discocellular lines on the underside of both wings which are present in the male, in the male the outer submarginal band is not broken up into spots as it is in the female, the caudal spot in the first median interspace is fully twice as large and not crowned with orange in the female as in the male, and finally the colour of the ground is so entirely different, in the male being said to be "ochreous-brown," and in the female "grey-white."

† *Rapala domitia*, Hewitson. *Deudorix domitia*, Hewitson, Ill. Diurn. Lep., p. 19, n. 7, pl. vi, figs. 6, 7, *male* (1863); id., Druce, Proc Zool. Soc. Lond., 1873, p. 353, n. 1 ; id., Butler, Trans. Linn. Soc. Lond., Zoology, second series, vol. i, p. 549, n. 4 (1877); id., Distant, Rhop. Malay., p. 280, n. 4, pl. xxiii, fig. 7, *male* (1885); id., Staudinger, Ex. Schmett., p. 279, pl. xcvi, *male* (1888). HABITAT : Malacca (*Butler*), Singapore (*Hewitson*), Sumatra (*Henley Grose Smith*), Borneo (*Druce*). EXPANSE : 1·65 to 1·90 inches. DESCRIPTION. "MALE. UPPERSIDE, *both wings* rufous-brown. *Forewing* with a longitudinal rufous band within the cell. *Hindwing* with the anal lobe and the *cilia* at the base of the tails white. UNDERSIDE, *both wings* yellow. *Forewing* with three black spots, one at the middle of the cell, a triangular one on the costal margin beyond the middle, and a smaller one between the second and third median nervules ; the apex and a large spot on the inner margin grey. *Hindwing* with one *tail* ; the outer margin brown, the caudal spot, the lobe, and two spots between them black, irrorated with blue, and above these two spots two parallel black lines. FEMALE does not differ from the male, except that the UNDERSIDE is nearly white, the third spot on the *forewing* scarcely seen." (*Hewitson*, l. c.)

end of the cell; *disco-cellular* nervules recurved, *lower discoidal* nervule from their middle; *discoidal cell* broad; *second median nervule* at one-fifth, *first* median at nearly one-half before the end of the cell. HINDWING, short, attenuated hindwards and produced into a very long tail [from the end of the first median nervule], anal angle lobed; *exterior margin* sinuous towards the tail; furnished with a prominent costal glandular patch [in the male only]; *costal nervure* abruptly arched at the base; *first subcostal nervule* emitted at one-half before the end of the cell; *disco-cellular* nervules oblique, *discoidal* nervule from their middle; *discoidal cell* broad; *second median nervule* from immediately before the end of the cell, *first* median at nearly one-half and extending to the end of the tail; *submedian nervure* straight, *internal* nervure recurved. BODY moderately stout; *palpi* porrect, [twice as long in the female as in the male], second joint squamose, very long, extending two-thirds beyond the head, third joint one-third its length, slender, naked; *legs* squamose, femora slightly pilose beneath; *antennæ* with a lengthened pointed club." (*Moore*, l. c.)

In the forewing the costal nervure ends opposite to the apex of the discoidal cell, the first subcostal nervule almost touches the costal nervure for a short distance, the base of the second subcostal is nearer to the base of the first subcostal than to that of the upper discoidal, the third subcostal originates about midway between the apices of the cell and of the wing; the disco-cellular nervules are upright, slightly concave, the middle a little shorter than the lower, the second median nervule originates some little distance before the lower end of the cell. In the hindwing in the male the glandular patch is large and well defined, almost quadrate, but with the two anterior corners a little rounded off; it is wholly placed anterior to the discoidal cell, and covers the base of the first subcostal nervule, but does not reach the point on the costal nervure where the upper disco-cellular nervule is given off; the disco-cellular nervules are of nearly equal length, straight, outwardly oblique, the second median nervule given off immediately before the lower end of the cell. The female has the wings broader and shorter than the male, the apex of the forewing less acute, the outer margin convex not straight, the hindwing much less produced hindwards, the tail shorter. The eyes are hairy.

Bindahara is a remarkable and most distinct genus, and is probably found in the Indo-Malayan region only. It occurs in North-East and South India, in Ceylon, in the Andaman and Nicobar Isles, in Burma, in the Malay Peninsula, and in several of the Islands of the Malay Archipelago. The male is very deep velvety black above, of almost exactly the same shade and character as *Apatura parysatis*, Westwood; the anal angle of the hindwing with the tail ochreous, the underside ochreous-brown, with darker brown bands and spots. In two species the male has a rich cyaneous patch on the outer margin of the hindwing on the upperside. The female is fuliginous-black above, the anal angle of the hindwing broadly white, enclosing a prominent deep black spot on the margin in the first median interspace, the tail white; underside also white, with rich deep brown bands and spots. The difference in the general appearance of the opposite sexes on the underside is perhaps greater than in any other Indian lycænid, owing to the ground-colour in the male being more or less fuscous, of the female pure white, though it is approached by the species of the genus *Sithon*, Hübner.

There has been terrible confusion regarding the proper identification of the species of this genus. The oldest described species is the *phocides* of Fabricius, who no doubt incorrectly recorded it from Africa. Mr. Butler doubtless gives a correct locality for it as Moulmein, Burma. The next species to be described is the *sugriva* of Horsfield. There can be no doubt whatever about this species, the male having a patch of blue on the upperside of the hindwing, a character which is presented by no other Indian species. As far as I know it is confined to South India, Ceylon, and Java. Mr. Moore quite incorrectly places this species as a synonym of *phocides*, with which it has nothing to do. The next oldest species is the *isabella* of Felder, described from the island of Amboina, the female of which, also from Amboina, was named *jolcus* by Felder. With this species I am not concerned, though Hewitson certainly incorrectly states that it is synonymous with *phocides*; it has a blue patch on the upperside in the male as in *sugriva*. Lastly Felder described *areca* from Kar Nicobar, and *kamorta* from Sambelong, the native name for Great

Nicobar Island. These two species are undoubtedly male and female of one species. Hewitson gave *areca* as a synonym of *sugriva*, and *camorta* as a distinct species. Mr. Wood-Mason and I piled confusion upon confusion by recording *sugriva*, var. *areca* from the Andaman Isles, while the species should have been *phocides* pure and simple. I trust that the synonymy of these species is satisfactorily cleared up in the following pages, to which end Mr. Distant has so largely contributed by pointing out what the true *phocides* is.

Key to the Indian species of Bindahara.

A. Male with no blue patch on the upperside of the hindwing.
   a. Both sexes, underside with prominent markings.
      1009. B. PHOCIDES, Sikkim, Bhutan, Sylhet, Burma, South Andamans, Malay Peninsula, Nias Island.
   b. Both sexes, underside with obsolete markings.
      1010. B. ARECA, Nicobar Isles.
B. Male with a blue patch on the upperside of the hindwing on the middle of the outer margin.
      1011. B. SUGRIVA, South India, Ceylon, Java.

1009. Bindahara phocides, Fabricius.

Hesperia phocides, Fabricius, Ent. Syst., vol. iii, pt. 1, p. 282, n. 85, *female* (1793) ; *Papilio phocides*, Donovan, Nat. Hist. Rep., vol. ii, pl. xliv, figs. 1, *female* (1834) ; *Myrina phocides*, Butler, Cat. Fab. Lep. B. M., p. 183, n. 1 (1869) ; *Bindahara phocides*, Distant, Rhop. Malay., p. 247, n. 1, pl. xx, fig. 25, *female* (1884) ; *Sithon sugriva*, var. *areca*, Wood-Mason and de Nicéville, Journ. A. S. B., vol. xlix, pt. 2, p. 232, n. 45 (1880) ; idem., id., l. c., vol. l. pt. 2, p. 249, n. 65 (1881).

HABITAT : Africa ? (*Fabricius* and *Donovan*), Moulmein (*Butler*), Province Wellesley, Perak, Singapore (*Distant*), Nias Island (*Kheil*), Burma (*Doherty*), Sikkim, Bhutan, Sylhet, South Andaman Isles.

EXPANSE : ♂, 1·25 to 1·70 ; ♀, 1·30 to 1·60 inches.

DESCRIPTION : " MALE. UPPERSIDE, *both wings* dark fuliginous-brown. *Hindwing* with the *tail* and anal lobe ochraceous, the latter with a fuliginous spot. UNDERSIDE, *both wings* brownish-ochraceous. *Forewing* with the following castaneous markings :—a spot at the base of the cell, a broad outwardly curved fascia crossing the cell near the middle, commencing on the costal nervure and continued to about the submedian nervure ; between this and the outer margin is another broad fascia, commencing near the costal margin and narrowly terminating at the submedian nervure ; and a narrow, obscure and more fuscous submarginal fascia ; at the end of the cell there is a narrow, disco-cellular castaneous streak. *Hindwing* with the following castaneous markings :—a series of basal spots, two narrow and much-waved and sinuated discal fasciæ crossing the wing beyond the middle, between which and the basal spots is a broad obscure fascia commencing on the costal nervure and terminating at the median nervure ; a dark submarginal line at the anal angle enclosing two blackish spots with scattered metallic greenish scales, and a prominent black spot on the anal lobe. *Body* and *legs* more or less concolorous with the wings. FEMALE. UPPERSIDE, *both wings* olivaceous-brown. *Hindwing* with a large white anal angular patch divided by the dark median nervules, and containing a large black marginal spot between the second and first median nervules, and a smaller and much more obsolete spot at the anal angle ; *tail* and anal lobe white, with black basal streaks. UNDERSIDE, *both wings* whitish. *Forewing* with the castaneous markings as in the male, the outer fascia narrowly margined with white, and the remaining ground-colour pale castaneous. *Hindwing* with the markings more distinct and linear than in the male." (*Distant*, l. c.)

Mr. Wood-Mason and I described the female of this species from the South Andaman Isles as follows:—" FEMALE. Smaller than the male. UPPERSIDE, *both wings* sepia-brown with a bronzy gloss, the spots and fasciæ of the underside scarcely showing through. *Hindwing* with a pure white patch divided by the brown veins, margined externally by a fine and sharp dark brown or black anteciliary line, and marked by a large circular black spot at the base of the tail on the anterior side and by another smaller lighter and less distinct one on the posterior side ; with the caudal lobe blackish, and the *tail* black with pure white cilia.

UNDERSIDE, *both wings* pure white marked as in the male with dark sepia-brown fasciæ and spots, but with the black caudal spots larger and the *cilia* of the posterior part of the hindwing pure white like those of the tails."

"It differs from *S.* [=*B.*] *phocides*, female (=*S. jolcus*, Felder, Hewitson, Ill. Diurn. Lep., *Lycænidæ*, pl. xiii, figs. 16, 17*) in the far less extent of the white patch on the upperside of the hindwing, and in the larger size and darker colour of the spots and fasciæ, as well as in the greater pureness of the white, of the underside generally. A male from the South Andaman Isles differs from a specimen from the Indian continent (Sylhet) only in its rather darker and more distinctly marked underside. The lighter apical portion of the forewing in the male on the upperside has a beautiful bronzy gloss changing to dark purple according to the incidence of the light. Both the insular and continental specimens, but especially the former, present slight traces of the blue marginal band so conspicuous on the upperside of the hindwing of Javan and Ceylonese examples [the *sugriva* of Horsfield], in the shape of a small patch of metallic green scales on the anterior caudal lobe. The male of this species, with its velvety black upperside, rich dark brown underside, and elongated hindwing produced into a long robust buff tail, presents a strong contrast to the dull-coloured female with her pure dazzling white underside conspicuously spotted and banded with dark brown, broader wings, and comparatively short and feeble white and black tails."

"*Sithon* [*Bindahara*] *kamorta*, Felder, is not the female of *S. sugriva*, var. *areca* [=*phocides*], as Felder has suggested, but that of a distinct though closely-allied species peculiar to the Nicobars, whence the Museum has recently received a specimen of the true male differing from *S. kamorta* just in the same way as *S. sugriva* male does from its female, which appears not to have been previously described." (*Wood-Mason* and *de Nicéville*, l. c. in Journ. A. S. B., vol. xlix.)

Mr. Butler notes that "The type of *P. phocides*, Fabricius, is in the Banksian Collection; it is not the insect figured by Mr. Hewitson, which is the true female of Felder's *M. jolcus*; but it is the female of an Indian representative of Horsfield's *M. sugriva*, of which we have the male." (*Butler*, l. c.)

B. phocides appears to be fairly common in the South Andaman Isles, but is extremely rare on the Continent of India, as I have only seen four specimens, of which three are males, one from Sikkim, one from near Buxa, Bhutan, and one from Sylhet, and one is a female from the Khasi Hills in the collection of the Rev. Walter A. Hamilton. The Indian Museum, Calcutta, also possesses a single male example from Perak, and the Phayre Museum, Rangoon, another taken in Rangoon in September.

1010. **Bindahara areca**, Felder. (PLATE XXIX, FIG. 242 ♂).

Myrina areca, Felder, Verh. zool.-bot. Gesellsch. Wien, vol. xii, p. 481, n. 105 (1862); *M. kamorta*, id., l. c., p. 485, n. 121 (1862); *M. camorta*, Hewitson, Ill. Diurn. Lep., p. 36, n. 31 (1863).

HABITAT: Kar Nicobar, Sambelong (*Felder*); Nicobar Isles generally.

EXPANSE: ♂, 1·1 to 1·6; ♀, 1·0 to 1·5 inches.

DESCRIPTION: "MALE. UPPERSIDE, *both wings* purpurascent-blackish. *Forewing* with the outermost part paler. *Hindwing* with the anal region, an annexed litura, marked with a blue dot near the subanal tooth, and the *tail* pale ochraceous. UNDERSIDE, *both wings* fulvous-ochraceous, each with a broad discal fascia palely obsolete, with fuscous catenular strigæ, outwardly circled with whitish. *Forewing* with the external margin, *hindwing* with the margin of the apex concolorous, but shining, the latter with more obsolete spots on the disc, an anteciliary line and a posterior undulate streak blackish, beyond this four black spots, the first two obsolete, the remainder much larger, each one inwardly circled with a metallic greenish ring, and a black spot in the anal lobe."

* The species here referred to is the *jolcus* of Felder, figured under that name by Hewitson from the island of Aru, which is almost certainly the female of Felder's *isabella*, and is quite distinct from *phocides*.

depressed (as seen from above) secondary sexual character in the male is pear-shaped, with its narrow end directed towards the base of the wing, extends slightly into the discoidal cell, and covers the bases of the subcostal nervules, reaching exactly to the point where the middle disco-cellular arises ; the disco-cellular nervules are outwardly oblique, nearly in one straight line, of equal length ; the second median nervule has its origin just before the lower end of the discoidal cell. The palpi in the males are much shorter and more slender than in the females. The eyes are hairy.

Virachola is abundantly distinct from *Deudorix*, Hewitson, and *Lehera*, Moore, neither of which have secondary sexual characters in the male. The shape and position of the glandular patch on the hindwing of the male will alone distinguish *Virachola* from the other genera of this group which possess male secondary sexual characters and have one tail and an anal lobe.

The genus at present contains three species, all of which are strictly confined to the Indian region, unless the *Deudorix antalus*, Hopffer (*vide* Trimen's "South African Butterflies," vol. ii, p. 107), which is said to be a near ally of *V. isocrates*, Fabricius, should turn out to be congeneric. The life-history of two of them is almost thoroughly known, the third species, *V. smilis*, Hewitson, is very rare, and the female imago has alone been described. The larvæ of *V. isocrates*, Fabricius, and *V. perse*, Hewitson, are internal feeders, eating the seeds of various fruits ; a full description of their interesting habits will be found under the descriptions of the species. All three butterflies of the genus are of large size, brightly coloured, with markings on the underside very much as in *Deudorix epijarbas*, Moore. The female of *V. isocrates* is aberrant, as it alone has no blue coloration on the upperside. Their flight is extraordinarily rapid, and can hardly be followed by the eye, but they usually soon settle and are then easy to catch.

Key to the species of Virachola.

A. Both sexes, underside, forewing with no spot in the cell towards the base in addition to the one on the disco-cellular nervules

a. Male, upperside deep violet-blue, with a rich purple iridescent gloss in some lights ; female, upperside violet-brown, with no purple gloss.

1012. V. ISOCRATES, throughout India except the desert tracts, Ceylon.

b. Male and female, upperside black, the lower basal area of the forewing and discal area of hindwing bright blue, no iridescent shot in the male.

1013. V. PERSE, throughout India except the desert tracts, Ceylon.

B. Female, underside, forewing with a large spot in the cell towards the base in addition to the one on the disco-cellular nervules.

1014. V. SMILIS, East India, Andaman Isles.

1012. Virachola isocrates, Fabricius.

Hesperia isocrates, Fabricius, Ent. Syst., vol. iii, pt. 1, p. 266, n. 29 (1793) ; *Polyommatus isocrates*, Godart, Enc. Méth., vol. ix, p. 633, n. 59 (1823) ; *Thecla isocrates*, Westwood, Trans. Ent. Soc. Lond., first series, vol. ii, p. 1, pl. i, *male* and *female*, *structure of imago*, and *pupæ* (1837) ; *Dipsas isocrates*, Horsfield and Moore, Cat. Lep. Mus. E. I. C., p. 33, n. 42 (1857) ; *Deudorix isocrates*, Butler, Cat. Fab. Lep. B. M., p. 181, n. 4 (1869) ; *Virachola isocrates*, Moore, Lep. Cey., vol. i, p. 104 (1881) ; *Hesperia pann*, Fabricius, Ent. Syst., vol. iii, pt. 1, p. 276, n. 67 (1793) ; *Papilio pann*, Donovan, Ins. India, pl. xxxviii, fig. 1, *female* (1800) ; On the habits of a species of Hair Streak, belonging to the genus *Thecla*, Downes, Calcutta, Journ. Nat. Hist., vol. ii, p. 408 (1842).

HABITAT : Throughout the plains of India (except the desert tracts, Assam and Burma), Ceylon.

EXPANSE : ♂, 1·5 to 1·8 ; ♀, 1·8 to 2·0 inches.

DESCRIPTION : "MALE. UPPERSIDE, *both wings* deep violet-blue, [the lower discal area of the forewing and almost the entire surface of the hindwing glossed in some lights with brilliant violet.] *Forewing* with a very indistinct ochreous spot, visible only in certain lights, beyond the cell. *Hindwing* with a slender black marginal line and small anal spots, the latter grey-speckled. *Cilia* greyish-white. UNDERSIDE, *both wings* pale vinous-grey, with a white-bordered disco-cellular streak, a discal transverse broad catenulated band, and a less

distinct single white submarginal line. *Hindwing* with a large black anal and subanal spot, the former inwardly white-bordered, the latter with an ochreous border, intervening space blue-speckled. FEMALE. UPPERSIDE, *both wings* violet-brown. *Forewing* with a more distinct ochreous spot beyond the cell than in the male, which is diffused hindwards in some specimens. *Hindwing* with a prominent subanal black spot which is inwardly bordered with ochreous, and outwardly by grey-white speckles, the speckles continued to the anal angle." UNDERSIDE, *both wings* as in the male. (*Moore*, l. c. in Lep. Ccy.)

LARVA ·8 of an inch in length when full-grown ; ground-colour blackish-brown, the constrictions between the segments well-marked, the head comparatively large, fuscous, covered with rugosities or short semicircular tubercles, the segments rapidly increasing in size to the fourth, then gradually tapering to the thirteenth, which latter is about as wide as the second segment ; second segment anteriorly flesh-coloured, the third segment entirely flesh-coloured, the seventh and eighth bearing a large dorsal square flesh-coloured patch, the three anal segments scutate, all the segments widely pitted and covered with short but coarse black bristles, which are more numerous at the sides and whitish. This larva is very ugly, to be accounted for perhaps by its passing its life out of sight in the interior of a fruit. In Calcutta I have reared the larva on the fruit of the *Randia dumetorum*, Lamk., which belongs to the Mader family (*Rubiaceæ*). I once found a larva in the fruit of the Loquot (*Eriobotrya japonica*, Lindl), of which it ate the hard central seed or stone only. It emerged on April 4th. Messrs. F. E. Pargiter and E. C. Cotes have bred it from the fruit of the Guava (*Psidium guava*, Raddi). Its usual food appears however to be the fruit of the pomegranate (*Punica granatum*, Linnæus). PUPA of the usual lycænid shape, brown, marked with a dorsal and lateral black line, the whole surface very rough, covered with tiny pits, furnished with a few short coarse bristles, which are most numerous round the sharp anterior ridge which encloses the head ; the wing-cases pale ochreous ; head rounded, anal segment blunt.

" This butterfly [*Virachola isocrates*] resides in the larva state in the interior of the pomegranate, seven or eight, at least [this is very unusual, I have never found more than one larva or pupa in a single fruit, two or three would probably be the maximum ordinarily, even then one or more would probably have to emigrate to a fresh fruit, before becoming full-fed], having been reared in the interior of the small fruit now exhibited. Of the mode in which the eggs are deposited by the female in the interior of the pomegranate no information has been received ; it is, however, probable that this is effected whilst the fruit is in its very young state. [The eggs are laid by the butterfly in the calyx of the flower of the young fruit.] The caterpillars feed upon the seeds and inner part of the fruit, which is thus rendered weak, and unable to support its own weight, and consequently liable to have its stem broken, and to fall to the ground with the first wind. This, however, would be destruction to the inclosed insects, since, in all probability, they would find it impossible to make their escape were the fruit to be suffered to lay rotting upon the ground. To obviate this evil, the caterpillars, when full-fed, have the instinct to eat a hole [this is incorrectly stated, there is always a hole in the fruit for the larva to cast forth its dejections], about a quarter of an inch in diameter, through the hard shell of the fruit, whilst it remains upon the tree ; through this hole they then creep to the stem of the fruit, and spin a white web, which they attach to the basal part of the fruit as well as to the stem, for about the distance of an inch along the latter. This web is sufficiently strong to support the pomegranate from falling after the wind has broken the stem near to the fruit."

" From the circumstance of this specimen of the fruit exhibited having as many holes in it as there were caterpillars inhabiting it, it is most probable that the web thus spun is a joint production of the whole. It is curious, as evidencing the instinctive impulses under which each of the inclosed larvæ must have acted, that, instead of availing themselves of the first aperture made in the fruit, each caterpillar should be at the trouble of making a hole for itself, a circumstance which renders it the more probable that all joined in spinning the web."

"But it will be at once asked, what necessity could there be for the caterpillars to secure the fruit from falling after each has bored a hole, and thus made its escape? This question is answered by the curious circumstance that, after so securing the fruit, the caterpillars return again into the pomegranate, in the hollow interior of which they undergo their transformations to the chrysalis state."

"Here, too, we may notice another interesting fact; namely, that the insect has the precautionary instinct, which acts as a second inducement, to make the aperture in the fruit in that stage of its existence in which it is furnished with organs best adapted for the purpose; for, had the larva omitted taking this step, the consequence would have been, that the poor insect, when come to its butterfly state, would have been a prisoner totally unable to make its escape, being unprovided with any instrument sufficiently powerful to make a hole in the shell."

"The chrysalides are attached horizontally upon the inner walls of the pomegranate, by means, first, of a patch of silk laid upon its surface, to the centre of which the tail of the chrysalis is attached, and second, of a slender silken thread passing from side to side over the base of the abdominal segments."

"Another curious instance of instinct yet remains to be noticed. The butterfly, so soon as ever it has escaped from the puparium, must make its escape out of the hole formed by the larva. Delay would be death, as the wings would soon acquire their full expansion of nearly a couple of inches, in which state it would, of course, be unable to creep out."

"In the chrysalis state the belly of the insect is placed in contact with the inner surface of the fruit; consequently, as the slit by which the butterfly escapes out of the puparium extends along the back, the under surface of the latter remains entire, the anterior lateral portions on each side the slit (extending as far as the whole coverings of the wings) curling up and laying close upon those parts which have covered the breast and limbs, leaving the abdominal portion in the same form as when it inclosed the insect." (*Westwood*, l. c.)

"At the time the pomegranate is in flower, and at a very early period, the Hair Streak may be seen very busily occupied about the flowers, and I have little doubt that the eggs are deposited at the bottom of the calyx, from the position in which I have seen the abdomen of the butterfly placed; as the fruit enlarges the eggs are enclosed, and in this situation matured."

"In order that I might obtain a perfect insect, I surrounded several of the fruit with fine gauze, but in such a manner as not in the least to interfere with the caterpillar in its labour of connecting the fruit and stalk by means of the web; but to my astonishment and disappointment this never took place; the caterpillars issued from the fruit, and finding their escape impeded, underwent their change on the external part, and so soon as this was effected, I removed the fruit from the tree for the purpose of placing it in a mosquito gauze house in my room. Subsequently I examined several of the fruit, but I never found any chrysalidæ, or the remains of any inside the fruit. I was very careful in my observations, and I came to the conclusion that the caterpillars in this instance deserted the fruit when ready to undergo their change." (*Downes*, l. c.) Professor Westwood is quite correct; there is no doubt that in nature this butterfly usually pupates within the fruit; on opening these I have found at different times dozens of pupæ or pupæ skins, but never more than one in each fruit. Mr. Downes is also partially right, as if the fruit are cut off the tree and placed in a box, the larvæ when full-fed will leave the fruit and pupate anywhere on the sides of the box or on the fruit.

There is one interesting question still to be referred to in the life-history of this butterfly—is it attended or not by ants in its larval state, and has it the special organs affected by the ants? Mr. W. C. Taylor, of Khorda, Orissa, writes "Larva attended by the ant *Formica nigra*, who clear away their droppings and act as sweepers, as well as guard the pupæ." His daughter, Mrs. Wylly, also writes "The larva of *Virachola isocrates* though louse-like in shape, differs considerably from those of *Catochrysops cnejus*, Fabricius, *Azanus ubaldus*, Cramer, and *Tarucus theophrastus*, Fabricius. The latter are inert and slow, the former is very brisk in its movements, and with the protrusible long neck, small head and strong jaws of a beetle

grub, is no doubt well-adapted for the work required in making its home. The length of the larva when full-fed is rather more than an inch, and in colour and shape much resembles a ripe mulberry. It had a glossy shining skin, very knobby and indented all over, of a blue and purple colour, and its three posterior segments covered with a squarish shield with a raised dingy yellow rim to it. The larva bores for itself when quite young a little clean-cut round hole from the outer rind of the fruit of *Punica granatum* to the heart. In this hole it spends its days with its head inside eating away at the green or ripening pips, and enlarging the hole as it increases itself in size. Sometimes three or four larvæ may be found buried in one pomegranate. When at rest and not eating it plugs up the outer hole deftly with the shield on its tail. It is a curious fact that the ants in the case of this species act as sweepers to the larva, hovering in attendance round the mouth of each hole and performing all the cleaning out operations with great regularity. The larva never leaves the fruit till full-grown [this is doubtful, I think it often seeks a fresh fruit, as I have frequently found a small fruit with the whole interior eaten and quite clean, and no pupa or pupa-skin, so in all probability the larva which inhabited that fruit had left it, and sought another], and then it descends the bark and seeks some crevice, crack, or knot in the stem of the tree, and there undergoes its transformations. The ants, as far as I could see, did not convey the larvæ to their nest at the foot of the tree, but as there were many larvæ on the tree and few pupæ, some may have been removed to their nest. [These missing pupæ were probably inside the fruit.] I was unable to find any eggs on the fruit or flowers, nor have I ever observed the ants "milking" any of the larvæ, nor any appearance of tentacles being present. The larva spins a slight but strong web from its mouth with which it binds the fruit to the stalk to prevent its being blown off by the wind, and later uses the silk to fasten itself to by the tail when ready to change to a pupa. The pupa is also attached by two threads flatly to the trunk, and is of a pinkish-brown colour like the bark of the pomegranate tree, with various speckles and marks of a darker brown, and a dark dorsal line dividing it down the centre. The head of the pupa is covered with a kind of plate rounded in front, straight at the neck." For my own part I have never seen ants attending the larvæ, nor have I been able to find the special organs affected by them, and without these I fail to see why ants should take any trouble for the larvæ.

"It is almost impossible with the net to get a really good specimen of *V. isocrates* or of *V. perse*. They are not only difficult to catch, but exceedingly swift, wary, and given to settling on high trees, but, when caught, difficult to secure without injury. There is a delicate bloom on a fresh specimen which the gentlest touch destroys. It is easily reared however. As is well known, the larva feeds inside the fruit of the pomegranate, and, some time before becoming a pupa, eats its way* through the tough rind and fastens the fruit with silk to its stalk, thus preventing it falling off in case it should wither before the Butterfly escapes, as it generally does. This operation is performed at night, and generally repeated night after night. I have taken a pomegranate infested with these larvæ (several usually inhabit each fruit) and made it stand in an egg-cup; in the morning it was so securely fastened that in taking up the fruit I lifted the cup. Of all animal instincts that I have seen or heard of, this is one of the most astonishing, and certainly the most difficult to reconcile with any theory of development. As far as I have observed it, the larva never leaves its shelter except for the definite purpose so necessary to its safety, and it taxes ordinary ingenuity to suggest any possible conditions under which some larvæ might have performed the act in the first instance without purpose. I have found this butterfly pretty common in Bombay and Poona from December or January till March at least." (*Aitken*, Journ. Bombay Nat. Hist. Soc., vol. i, p. 216, n. 46 (1886).

* This statement is slightly misleading. From the very earliest stages the young larva makes a hole in the fruit, which it gradually enlarges as it grows, and through which it throws out its dejections. At any period the larva can leave the fruit in which it lives, and in fact not infrequently does so, entering a fresh fruit which suits it better.

Mr. F. E. Pargiter in 1881 wrote this note "The larva [of *V. isocrates*] feeds on the leaves [?] and fruit of the Guava tree. It is rather plentifully clothed with short whitish hair. In the two white spots at the tail are two small horn-like processes, which the larva continually protrudes and retracts." This latter note appears to be conclusive as to the larva having the special organs affected by ants, and that it is attended by ants, though I have failed to find these.

V. isocrates is very common in Calcutta during the winter, much affecting the flowers of the *Poinsettia*. It appears to occur almost everywhere in the plains of India except the desert tracts, but it is not found in Assam or Burma.

1013. **Virachola perse,** Hewitson.

Deudorix perse, Hewitson, Ill. Diurn. Lep., p. 18, n. 2, pl. viii, figs. 24, 25 *male* ; 26, *female* (1863) ; *Virachola perse*, Moore, Lep. Cey., vol. i, p. 104, pl. xl, figs. 1, *male* ; 1a, *female* (1881) ; idem, id., Proc. Zool. Lond., 1882, p. 250.

HABITAT : Himalayas, Dehra Dun, Orissa, Bombay, Nilgiris, Ceylon.

EXPANSE : ♂, 1·40 to 1·95 ; ♀, 1·80 to 2·35 inches.

DESCRIPTION : "MALE. UPPERSIDE, *both wings* brown, the middle silvery blue. *Hindwing* with the veins and a spot on the anal lobe black. UNDERSIDE, *both wings* with a spot at the end of the cell and a transverse macular band beyond the middle, all rufous-brown, bordered on both sides with black ; a submarginal band of brown spots. *Hindwing* with a black spot near the base ; the caudal spot, the lobe, and spot between them which is irrorated with blue, black. FEMALE, differs only from the male in being larger, and in having a medial spot of white on the UPPERSIDE of the *forewing*." (*Hewitson*, l. c.)

MALE. UPPERSIDE, *both wings* deep purplish-black, deeper black in the discoidal cell. *Cilia* slightly ochreous. *Forewing* with the basal area from the inner margin to just within the discoidal cell, not nearly reaching the outer margin, and bounded anteriorly partly by the first median nervule, rich shining bright blue ; the wing sometimes otherwise unmarked, sometimes with a small, often with a large round discal ferruginous-ochreous spot or patch beyond the cell. *Hindwing* with the costa broadly, the outer margin decreasingly black, the abdominal margin pale fuscous, the rest of the wing blue as in the forewing ; the anal lobe centred with dull ochreous, outwardly marked by a black spot ; *tail* black tipped with white. UNDERSIDE, *both wings* reddish-vinous. *Forewing* with the inner margin paler ; two heavy short black lines on either side of the disco-cellular nervules, a discal catenulated band from the costa to the submedian interspace, each spot with blackish outer edges, an indistinct submarginal macular darker fascia. *Hindwing* with a prominent blackish rounded spot towards the base of the wing below the costal nervure ; two spots enclosing the disco-cellular nervules ; a discal irregular catenulated band ; a submarginal indistinct macular fascia ; the anal lobe black, a small round black spot on the margin in the first median interspace surrounded by a pale ochreous ring. FEMALE. UPPERSIDE, *both wings* with the blue coloration paler and more diffused than in the male, merging into a whitish patch, sometimes tinged with ochreous, beyond the cell in the *forewing*. Otherwise as in the male.

The LARVA when full-grown and fully extended is about ·9 of an inch in length, sometimes even 1·1 inches long ; its general ground-colour is rather deep flesh-colour or pinky, more or less irregularly blotched with darker reddish-brown ; the whole surface is smooth and shiny, thickly set with minute black hairs or bristles. The divisions between the segments are fairly-well marked, as each segment slopes gradually upwards from before backwards, all the segments are very much wrinkled and pitted, and each bears below the spiracles a small wart-like tubercle covered with longish white bristles ; there is also a similar but smaller subdorsal series of tubercles and bristles. The larva is of the usual lycænid shape, the head smooth, pale, and completely retractile into the second segment, the third segment the largest, whence the remaining segments gradually decrease in width to the last. The two anal segments are abruptly cut off or flattened from above (scutate), this round depressed portion being largely used by the larva when at rest inside the fruit on which it feeds to close the orifice in the fruit through which its

evacuations are ejected. In some specimens on the seventh and eighth segments in the middle of the back are two large square yellowish-white marks, one on each segment, divided on the dorsal line by a line of the ground-colour. The PUPA is also of the usual lycænid shape, coloured very similarly to the larva, being pinkish-brown blotched with darker brown or black, with a few short bristles at the sides. The larva changes to a pupa inside the fruit; and to protect itself spins a most perfect trap-door furnished with a hinge on one side on the inside of the fruit, and turns to a pupa with its head placed exactly opposite the trap-door. The trap-door opens inwards, and I presume the imago on emerging draws the door towards itself with its front legs and thus makes an opening by which to emerge. I can find no trace of the erectile tubercles on the twelfth or of the mouth-like opening on the eleventh segment that are often present in lycænid larvæ, and I presume such would be useless, as ants do not attend these larvæ as far as I have seen. The larvæ feed on the fruit of *Randia dumetorum*, Lamk. The above description has been taken from larvæ obtained in Sikkim at about 2,500, in January, on the 20th of the month the fruit contained both larvæ full-grown or nearly so and pupæ.

"I do not think I have met with *V. perse*, Hewitson, except on the hills, where it is common, appearing in December when the fruit of the "Ghela" (*Randia dumetorum*), on which the larva feeds, is ripening, and remaining till March or April. The larva has the same curious instinct as *V. isocrates*, Fabricius, and needs it more, for the Ghela fruit withers at once when attacked, and would inevitably fall before its tenant had reached the pupa state if not artificially supported. I have found only one larva in each fruit, and have sometimes noticed ants going in and out of the hole made by it, for what purpose I cannot say. The stony hardness of the fruit turns the edge of one's penknife and of one's curiosity too. This Butterfly has the habit of taking its station, during the hottest hours of the day, on a particular leaf, from which it darts out in pursuit of every other Butterfly that passes by. This habit characterises a few brilliant genera in families widely different. It is strong in *Charaxes*." (*Aitken*, Journ. Bombay Nat. Hist. Soc. vol. i, p. 216, n. 47, 1886). Mr. Aitken's note regarding ants visiting the larvæ of this species is interesting, if the larvæ really do not possess the special organs for secreting the fluid of which ants are so fond, I fail to see what can be their object in attending the larvæ.

V. perse has a wide range. Mr. A. Grahame Young has taken it at Mundi in the Western Himalayas at 3,200 feet elevation in August, Mr. Hocking also obtained it in the Kangra Valley, Mr. P. W. Mackinnon at Masuri and in the Dehra Dun, in Sikkim it is on the wing in January, February, March, May, October, November, and December, and not improbably may be met with there in every month in the year, Mr. W. C. Taylor has sent me many specimens from Orissa, it occurs according to Colonel Swinhoe in many localities in the Bombay Presidency, Mr. G. F. Hampson informs me that it is found in the plains at the foot of the Nilgiris, but is not common, and lastly in Ceylon it occurs in the "Eastern Province, plains, forest-land, rare, August" (*Hutchison*).

1014. **Virachola smilis,** Hewitson. (FRONTISPIECE, FIG. 127 ♀).

Deudorix smilis, Hewitson, Ill. Diurn. Lep., p. 18, n. 3, pl. viii, figs. 22, 23, *female* (1863).

HABITAT: East India (*Hewitson*), South Andaman Isles.

EXPANSE: ♀, 1·7 to 2·0 inches.

DESCRIPTION: "FEMALE. UPPERSIDE, *both wings* brown, the middle cerulean blue. *Hindwing* tailed; the veins, the caudal spot, a spot on the anal lobe, a submarginal line, and the *tail* (except the tip) black. UNDERSIDE, *both wings* with the spots and bands as in *Amblypodia*, [= *Arhopala*, Boisduval]; with spots near the base, a large spot at the end of the cell, a transverse band (broken at the middle of the forewing), all rufous-brown, bordered on both sides with black. *Forewing* with a submarginal band of brown spots. *Hindwing* with the caudal spot, the lobe (which is crowned with silver), a spot between them (which is irrorated with silvery blue), the outer margin, and the *tail*, all black; a band of pale blue above the lobe, and a submarginal line of white." (*Hewitson*, l. c.)

FEMALE. UPPERSIDE, *forewing* with the costa broadly, the outer margin more broadly, the apex broadest of all, black; the rest of the wing bluish-purple, occupying the lower half of the discoidal cell. *Hindwing* with the costa and outer margin broadly black, the abdominal margin pale fuscous, the disc bluish-purple, with the anal lobe black, inwardly marked with a dull ochreous line, outwardly with a line of metallic green scales, leaving the middle of the lobe black. UNDERSIDE, *both wings* pale vinous brown. *Forewing* with a round dark spot near the base of the discoidal cell, a large quadrate spot closing the cell, a discal catenulated band consisting of seven spots, the series strongly broken in the middle, the three lower spots below the third median nervule being shifted strongly inwards, a spot in the submedian interspace just below the origin of the first median nervule, a macular indistinct submarginal fascia. *Hindwing* with a large round rich deep brown spot in the subcostal interspace near the base of the wing, a duplex heavy spot on the disco-cellular nervules, an irregular discal catenulated macular band, its lower portion shaped like a bill-hook, the handle of the hook on the abdominal margin, with a rounded spot above it on the margin near the base of the wing; the anal lobe intensely black, a small round black spot in the first median interspace on the margin faintly surrounded with ochreous; between this spot and the anal lobe is a patch of brilliant metallic green scales, which are continued up to the abdominal margin; a fine anteciliary black line, inwardly defined by an equally fine white line.

This description has been made from a single female example taken by Mr. R. Wimberley in the Andaman Isles. The species must be very rare. Mr. Hewitson's locality for it, "East India," is terribly vague.

The figure shews both sides of the specimen above-mentioned in my collection.

Genus 175.—SINTHUSA, Moore. (FRONTISPIECE).

Sinthusa, Moore, Journ. A. S. B., vol. liii, pt. 2, p. 33 (1884); id., Distant, Rhop. Malay. p. 461 (1886).

"MALE. FOREWING, small, somewhat broad; *costa* arched at the base, *apex* pointed *exterior margin* slightly oblique and convex, *posterior* margin convex near the base; *subcostal nervure* five-branched, *first subcostal nervule* emitted at nearly one-half, *second* at one-fourth, and *third* from near the end of the cell, third bifid near its end; *discoidal cell* extending to half length of the wing; *disco-cellular nervule* slender; *discoidal* nervule from its middle; *first median* nervule at more than one-third and *second* median from near the end of the cell; *submedian nervure* straight. HINDWING, small, short, broad, *costa* arched in the middle, *exterior margin* with a single slender *tail* from the end of the first median nervule; *discoidal cell* broad, triangular, extending half the wing; *first subcostal nervule* at one-half before the end of the cell; *disco-cellular* nervule oblique, slender; *discoidal* nervule from its middle; *first median* nervule at nearly one-half and *second* median from near the end of the cell; *submedian* and *internal nervures* recurved. *Palpi* porrect, second joint long, third joint short, slender, pointed; *antennæ* with a large thick-pointed club. Type *S. nasaka*, Horsfield." (*Moore*, l. c.)

In the forewing of the type species the costal nervure reaches to a little beyond the apex of the discoidal cell, the first subcostal nervule originates at about two-thirds of the length of the cell from the base, and is bowed upwards towards the costal nervure, which it almost touches for some little distance, the second subcostal is given off about midway between the bases of the first subcostal and upper discoidal, the third subcostal is short, and arises nearer to the apex of the wing than of the cell; the disco-cellular nervules are upright, nearly straight, the middle shorter than the lower; the second median nervule is given off some little distance before the lowere nd of the cell; in the male the inner margin is bulged out just before its middle, and furnished with a tuft of hairs attached to the margin and turned forwards. In the hindwing there is a small anal lobe in addition to the single tail; the disco-cellular nervules are straight and strongly outwardly oblique, of equal length; the male is furnished with an oval depressed (as seen from above) glandular patch below the costa extending posteriorly slightly into the discoidal cell, and occupying the area formed by

the bases of the subcostal nervules, its greatest area being in the subcostal interspace above the subcostal nervure. In shape this patch is as in *Virachola*, in which genus it reaches to the origin of the upper disco-cellular nervule, while here it stops considerably short of that point. The eyes are very hairy.

The genus *Sinthusa* appears to be a small and compact one, containing eight species up to date according to the various authors who have described them. There is much similarity between them; in the males of all except *S. virgo*, Elwes, the upperside is black, the basal half of the forewing obscurely blue, of the hindwing more or less brilliant blue. In *S. virgo* the upperside is pale blue with broad outer black margins. On the underside all the species have a short band defining the disco-cellular nervules, and a discal band which is more or less broken on both wings, the hindwing with the anal lobe and the spot in the first median interspace on the margin black crowned with orange, with some greenish-silvery markings between them and above the anal lobe. The females are fuliginous-black above, sometimes with an orange or ochreous-white patch on the disc of the forewing, usually with more or less white towards the anal angle of the hindwing. All the species are forest insects, of small size, and quick flight, settling on the leaves of trees and bushes. The genus occurs throughout the Himalayas, in Assam, and thence southwards through the Malay Peninsula, and in Sumatra, Java, and China. The Indian species appear to be very variable, and when all shall be thoroughly known about them several will doubtless have to be sunk as synonyms. The females of all the species are very much rarer than the males.

Key to the Indian species of Sinthusa.

A. Male, upperside, forewing obscure dark blue on basal half, hindwing rich brilliant blue.

- a. Male, upperside, hindwing usually with the blue coloration confined broadly to the outer margin: both sexes, underside, with the markings very narrow, straight, and clearly defined.
  - 1015. S. NASAKA, Himalayas, Assam, Java.
  - 1016. S. AMBA, Burma, Malay Peninsula.
- b. Male, upperside, hindwing with the blue coloration spread over the entire surface; both sexes, underside, with the markings much broader, more irregular, and less distinct.
  - 1017. S. CHANDRANA, Himalayas, Assam, Upper Burma.

B. Male, upperside, both wings shining light silvery blue.

- 1018. S. VIRGO, Sikkim.

1015. Sinthusa nasaka, Horsfield.

Thecla nasaka, Horsfield, Cat. Lep. E. I. Co., p. 91, n. 23 (1829); *Deudorix nasaka*, Hewitson, Ill. Diurn. Lep., p. 24, n. 21, pl. v, figs. 45, 46, *male* (1863); *Hypolycæna nasaka*, Moore, Proc. Zool. Soc. Lond., 1882, p. 249; id., de Nicéville, Journ. A. S. B., vol. lii, pt. 2, p. 77, n. 17, pl. ix, fig. 2, *female* (1883); *Sinthusa nasaka*, Moore, Journ. A. S. B., vol. liii, pt. 2, p. 34 (1884).

HABITAT: Kangra District, Kulu Valley, Sikkim, Assam, Java.

EXPANSE: ♂, 1·00 to 1·15; ♀, 1·25 inches.

DESCRIPTION: "MALE. UPPERSIDE, *both wings* deep blackish-brown. *Forewing* with a shade of dark blue from the base to the middle, which only appears in a certain light. *Hindwing* narrow and somewhat lengthened, with a slight oblong excavation along the posterior margin, succeeded by an obtusely-rounded tooth exterior of the caudal appendage; covered with a rich cyaneous tint excepting the exterior [costal] and interior borders; the latter is gray, and constitutes a canal to receive the abdomen. UNDERSIDE, *both wings* gray with pale ochraceous-brown posterior borders, spreading over the tip and more intensely-coloured exteriorly; a narrow delicately-striped band, consisting of two parallel brown strigæ edged with white and an intermediate yellow thread, which is more distinct in the hindwing, extends across the middle of both wings, being regular in the former and somewhat interrupted in the latter, until it reaches the anal region, where it passes, after an abrupt curve, irregularly flexuose to the inner margin; on the disc of each wing stands a short transverse double litura. *Hindwing* has the anal appendage oblong, black on the surface, fringed with gray, and has adjoining to it, in the

posterior margin, two ocellate spots of more than usual size, the exterior one presenting a regularly orbicular black spot in place of a pupil, and being bounded exteriorly by a narrow pale rufous ring, a more saturated narrow rufous arc forming the interior iris; this is continued in form of a narrow band in an oblique course through the middle of the adjoining spo to the anal appendage, from whence it rises again for a short distance along the extreme angle of the wing, being edged exteriorly by a black streak covered with greenish-silvery irrorations; an obsolete series of three successively paler black lunules, of which the first is covered with a silvery crescent, stands exterior to the large ocellus in close contact with the posterior margin. *Head* and *body* brown above. *Thorax* covered with lax white hairs. *Abdomen* with shorter yellowish hairs underneath. *Antennæ* banded with white and tipt with rufous." (*Horsfield*, l. c.) Described from a single specimen.

"MALE. Differs from Horsfield's description on the UPPERSIDE of the *hindwing* in that the cyaneous colour is placed broadly on the outer margin, extending upwards towards the middle of the wing between the third median nervule and the subcostal nervure, not as stated by Horsfield covering the hindwing 'excepting the exterior and interior borders.' Hewitson's figure shows the hindwing entirely covered with the blue colour. [In specimens from Sikkim the blue colour pervades all the hindwing as described by Horsfield and figured by Hewitson, it is only restricted in specimens from the Western Himalayas.] *Forewing* furnished on the underside with a bunch of long black hairs attached to the inner margin near the base and folded beneath. *Hindwing* with a corresponding cup-like depression on the underside, marked on the upperside by a shining bare round patch near the costal base of the wing and covered by the forewing. A male from Sikkim differs from specimens taken in the Kulu Valley in the ground-colour of the underside being much darker and of a cupreous purple shade. FEMALE. UPPERSIDE, *both wings* glossy fuliginous, paler on the disc of the *forewing*. *Hindwing* with a conspicuous black spot on the margin between the first and second median nervules, marked anteriorly with scattered white scales, which also appear decreasingly in the two next interspaces beyond and in the one before that containing the black spot, a fine marginal white line not reaching the outer angle, then a black line; the *cilia* white between the tail and the discoidal nervule; the anal lobe with an ochreous and metallic green spot, *tail* black with a white tip. UNDERSIDE, *both wings* agreeing in the ground-colour with N.-W. Himalayan specimens."

"The single female described above was taken at a low elevation in Sikkim in October." (*de Nicéville*, l. c.)

Mr. Moore says that specimens from the Kangra Valley are "identical with Javan type." In my long series of specimens I find considerable variation: those from the Western Himalayas have the ground-colour of the underside much paler and all the markings less prominent than those from the Eastern Himalayas; the size of the black spot on the underside of the hindwing near the margin in the first median interspace is very variable, being in some specimens obsolete, in others very large, broadly surrounded with orange; and there are many other minor differences. The black portions of the wings on the upperside are beautifully glossed with golden bronze in some lights. *S. nasaka* appears to be nowhere common, though Mr. A. Grahame Young has obtained several specimens in the Kulu Valley, Mr. Otto Möller possesses specimens of both sexes taken in March and June, and the Rev. Walter A. Hamilton has sent it to me from Shillong.

1016. **Sinthusa amba**, Kirby.

Hypolycæna amba, Kirby, in Hewitson's Ill. Diurn. Lep., Suppl., p. 32, n. 25, pl. v*b*. figs. 44, 46, *male*; 45, *female* (1878); *Sinthusa amba*, Distant, Rhop Malay., p. 461, n. 1, pl. xliv, figs. 12, *male*; 19, *female* 1885); id., Doherty, Journ. A. S. B., vol. lviii, pt. 2, p. (1889).

HABITAT: Mergui, Myitta, Burma; Malacca, Perak, Malay Peninsula.

EXPANSE: ♂, ♀, ·9 to 1·0 inch.

DESCRIPTION: "MALE. UPPERSIDE, *forewing* dark brown, glossed with purplish-blue to beyond the middle, except along the costa, the blue portion of the wing terminating behind in a

regular curve. *Hindwing* more brilliantly glossed with rich purplish-blue, costa and inner margin light brown. The purple of the wings is edged with black towards the costa, and it terminates towards the inner margin in a narrow detached purple stripe ending just outside the anal spot, and edged on both sides with black. *Cilia* and the short and slender *tail* are black, the anal lobe is black, dusted with sky-blue in the middle, and marked with an orange spot on its inner edge. UNDERSIDE, *both wings* dull bluish-grey, shading into rufous-brown on the hind margins, two parallel dashes of the same colour at the end of the cells, and two narrow black lines filled up with orange crossing the wings beyond the middle, on the forewing they are nearly straight, and on the hindwing irregular, forming a right angle towards the anal angle, above which, near the middle of the inner margin, is a blackish spot. *Hindwing* with the anal and caudal spots deep black, bordered within with orange and outside by a light grey line, and there are some indistinct dark submarginal markings above them. The neighbourhood of the anal spots is irregularly dusted with silvery blue. FEMALE. UPPERSIDE, *both wings* rufous-brown. *Forewing* with the marginal third darker. *Hindwing* with the hinder half of the hind margin bluish-white, intersected by a narrow black line at the base of the cilia; within this line are three black spots between the nervules, preceding the anal spot; the markings towards the anal angle do not differ from those of the male. UNDERSIDE, *both wings* as in the male. *Cilia* white. *Antennæ* ringed with black and white, the club black, tipped with orange, and preceded (in the female only) by a long white spot on the underside."

"Not closely allied to any known species." (*Kirby*, l. c.) With regard to this last remark, Mr. Kirby could hardly have known of the existence of *S. nasaka*, Horsfield, to which this species is evidently very closely allied. I include it amongst the Indian species of the genus on the strength of specimens obtained by Mr. Doherty at Myitta, in the Tenasserim Valley, and at Mergui, Burma, in the cold weather. Mr. Doherty remarks of it "Distinguished from *S. nasaka* by the richer blue of the forewing, and the much broader blue area of the hindwing. I am uncertain as to the position of the genus. It may possibly be better placed next to *Hypolycæna*, Felder." I have not seen a specimen of the species.

1017. **Sinthusa chandrana**, Moore.

Hypolycæna chandrana, Moore, Proc. Zool. Soc. Lond., 1882, p. 249, pl. xi, figs. 2, 2*a*, *male*; id., de Nicéville, Journ. A. S. B., vol. lii, pt. 2, p. 78, n. 18, pl. ix, fig. 1, *female* (1883); *Chliaria chandrana*, Moore, Journ. A. S. B., vol. liii, pt. 2, p. 33 (1884); *Hypolycæna grotei*, Moore, Proc. Zool. Soc. Lond., 1883, p. 527, pl. xlix, fig. 5, *male*; *Sinthusa grotei*, id., Journ. A. S. B., vol. liii, pt. 2, p. 34 (1884).

HABITAT: Himalayas, Assam, Upper Burma.

EXPANSE: ♂, ♀, 1·0 to 1·3 inches.

DESCRIPTION: "Allied to *H.* [=*S.*] *nasaka*, Horsfield. MALE. UPPERSIDE, *both wings* violet-brown. *Forewing* with the lower basal and discal areas dull violet-blue, and the medial area of the *hindwing* purplish violet-blue; marginal line and anal lobe black. UNDERSIDE, *both wings* olive-grey. *Forewing* with a broad disco-cellular slenderly-black-lined white-bordered streak, a similar broken discal band and a similar marginal narrower lunular band. *Hindwing* with a similar disco-cellular streak, a discal band, which is broken beyond the cell and bent upwards above the anal angle, and a marginal dentated band ending in a large red spot and the anal lobe and an intervening streak, the spot and the anal lobe black-centred, the streak with metallic-green borders; a white-bordered black spot on the costa near the base, another at the end of the cell, and a less distinct spot above the anal angle. *Cilia* whitish." (*Moore*, l. c. in Proc. Zool. Soc. Lond., 1882.) "FEMALE. UPPERSIDE, *both wings* dull uniform fuliginous, the anal lobe (as in the male) black with an ochreous and metallic green spot. UNDERSIDE, *both wings* paler than in the male, being almost pure white, the markings similar but also paler and more diffused."

"This species is very near to the Javan *Thecla malika*, Horsfield (Cat. Lep. E. I. Co., p. 90, n. 22, 1829)." (*de Nicéville*, l. c.) It is glossed with golden bronze above as in *S. nasaka*.

Mr. Moore in describing this species says that it is allied to the *Thecla nasaka* of Horsfield. Necessarily so, as the two species are in the same genus, but he should have said how

his species differs from the *Thecla malika* of Horsfield. The name "*chandrana*" is based on a misconception ; it is evidently derived from the name of the river Chandra which runs through Lahoul, the habitat given for the species, which never could have come from there, the *Sinthusæ* being forest-haunting species, and Lahoul being bare of trees. The type specimens of *S. chandrana* were probably captured by Mr. A. Grahame Young in South Kulu at 5,000 feet elevation, and given by him to the Rev. H. Hocking, who as usual did not ticket the specimens. I have no hesitation in placing Mr. Moore's species "*H.*" *grotei*, described from "N.-E. Bengal," as a synonym of *S. chandrana,* as I find from the long series of this species that I possess that the typical Western Himalayan form (*chandrana*) runs into and is found with the typical Eastern Himalayan form (*grotei*). Lastly Mr. Moore in 1884 placed *chandrana* in his new genus *Chliaria,* but this is clearly incorrect, because *Chliaria* has two subcostal nervules to the forewing while *chandrana* has three, and two tails to the hindwing while *chandrana* has but one.

I find that *S. chandrana* is one of the most variable of the *Lycænidæ.* In the Western Himalayas, from whence I have the fewest specimens, it appears to be fairly constant, the catenulated bands of the underside narrow and clearly defined. It is in Sikkim and Assam that the species varies so much. Here typical *chandrana* is occasionally met with, but the more common form has the bands of the underside much broader, often more or less confluent, very prominent, and the ground-colour much darker. The females show extraordinary variability on the upperside. Some specimens are entirely glossy fuliginous-black, with some obscure irrorated white patches between the veins near the outer margin of the hindwing ; others have a small whitey-ochreous patch on the forewing, with the white on the hindwing more developed ; others have a large whitey-ochreous patch on the forewing, the outer half of the hindwing also white ; lastly Mr. Möller possesses a very aberrant Sikkim specimen in which there is a bright ochreous somewhat large oval patch on the disc of the forewing, the hindwing unmarked. Mr. P. W. Mackinnon possesses a most typical specimen of *S. grotei* taken by himself in the Dehra Dun at the end of July. In Sikkim *S. chandrana* occurs from March to May and again in September, but is by no means a common species, at Shillong it occurs in March, and from July to September. I possess a single specimen from Tsenbo, Upper Burma, taken by Major Adamson in May.

I think it probably that the "*Thecla*" *pratti* of Leech, Trans. Ent. Soc. Lond., 1889, p. 110, n. 49, pl. vii, fig. 4, *male*, from Foochau and Kiukiang in China, will hereafter be shewn to be a synonym of *S. chandrana.*

I append as foot-notes descriptions of *S. malika*, Horsfield, and *S. grotei*, Moore.*

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* *Sinthusa malika*, Horsfield. *Thecla malika*, Horsfield, Cat. Lep. E. I. C., p. 90, n. 22 (1829) ; *Dipsas malika*, Horsfield and Moore, Cat. Lep. Mus. E. I. C., vol. i, p. 37, n. 43, pl. i*a*, fig. 5, *male* (1857) ; *Myrina malika*, Hewitson, Ill. Diurn. Lep., p. 37, n. 34, pl. xv, figs. 41-43, *male* (1863) ; HABITAT : Nias Island, Sumatra, Java. EXPANSE : *Male.* 1·1 inch. DESCRIPTION : "MALE. UPPERSIDE, *both wings* deep blackish-brown. *Forewing* with a shade of dark blue from the base to the middle, which only appears in a certain light. *Hindwing* narrow and somewhat lengthened, with a slight oblong excavation along the posterior margin, succeeded by an obtusely rounded tooth exterior of the caudal appendage ; covered with a rich cyaneous tint excepting the exterior and interior borders; the latter is gray, and constitutes a canal to receive the abdomen. UNDERSIDE, *both wings* white with a bluish shade ; a short brown streak, transversely truncated at each end, stands a little before the disc. *Forewing* with a yellowish-brown, somewhat cupreous posterior margin, spreading along the tip : a transverse [discal] striga of six or seven oblong subconfluent dots, which is interrupted on the disc, the continuation from the medial area being somewhat posteriorly disposed *Hindwing* with a similar series at a corresponding distance from the base, consisting of oval dots disposed in interrupted and somewhat unequal pairs, passing in an irregular curve across the wing, the terminal streak at the inner margin being transversely disposed, oblong and larger than the others ; along the posterior margin passes a series of dots, decreasing successively in size and strength of tint from the outer apical angle towards the caudal appendage, being confined internally by an undulated brown band ; of two ocellate spots in the anal region, the exterior one is bedded in an irregular rufous patch, which has an undulated interior margin, and tapers off at each extremity in a short striga ; the interior one, situated on the anal appendage itself, is surrounded by a white cilia, the intermediate space being occupied by a greenish metallic spot, and the oblong portion of the anal angle is marked by a black stripe covered by a branch from the rufous band. *Body* dark blackish-brown, *eyes* bordered by a white streak, *antennæ* black annulated with white and terminated by a grayish tip." (*Horsfield,* l. c.) Described from a single specimen.

Sinthusa grotei. Hypolycæna grotei, Moore, Proc. Zool. Soc. Lond., 1883, p. 527, pl. xlix, fig. 5, *male* ; *Sinthusa grotei,* Moore, Journ. A. S. B., vol. liii, pt. 2, p. 34 (1884). HABITAT : N.-E. Bengal.

I also give a description of *S. amata*, Distant, which has been described from the Malay Peninsula; it not improbably will hereafter be found to be but a variety of *S. malika*, Horsfield.*

1018. **Sinthusa virgo**, Elwes. (FRONTISPIECE, Fig. 134 ♂).

Hypolycæna virgo, Elwes, Proc. Zool. Soc. Lond., 1887, p. 446; *Hypolycæna (? Sinthusa) virgo*, id., Trans. Ent. Soc. Lond., 1888, p. 396, n. 309, pl. viii, fig. 7, *female*.

HABITAT: Sikkim.

EXPANSE: ♂, 1·35; ♀, 1·40 to 1·50 inches.

DESCRIPTION: "FEMALE. UPPERSIDE, *forewing* black, with a large discal patch of French-grey extending to the hind margin inwardly. *Hindwing* grey powdered with black, and becoming dull black on the costal margin, with a single narrow black *tail* tipped white, and a small fuscous lobe at the anal angle. *Cilia* white, narrow towards the apex of the forewing. UNDERSIDE, *both wings* bright French-grey. *Forewing* with a distinct transverse sinuous yellowish band, narrowly edged black on both sides about two-thirds of the length, not extending quite to the hinder margin; a short double-lined bar at the end of the cell, and an indistinct outer band near the edge. *Hindwing* with similar bands, of which the first extends in the usual broken W to the inner margin, and in addition a short band of three blackish spots within the discal bar; at the anal angle two blue spots, of which the outer is half black. *Antennæ* ringed black and white, with a fuscous tip to the club. *Body* above black, with grey hairs; pale grey beneath."

"Described from a single perfectly fresh female, which I took on May 27th, 1886, in the same place as *Chilades* [*Orthomiella*] *pontis*, mihi. Though I visited the spot on several occasions, I never saw another, and the male will probably be found earlier in the season. Notwithstanding the very numerous species of this group of *Lycænidæ* which have been described from Sikkim, I think this is so well distinguished by the pattern of the underside that it cannot be the female of any known species." (*Elwes*, l. c. in Proc. Zool. Soc. Lond.)

MALE. UPPERSIDE, *both wings* shining light blue; *cilia* white, but becoming dusky towards the apex of the forewing, tipped with black on the anal lobe. *Forewing* with the costa as far as the subcostal nervure, the outer margin broadly, the apex still more broadly black. *Hindwing* with the costa very broadly black, the abdominal margin whitish, an anteciliary fine black line, the veins outwardly more or less broadly bordered with black; *tail* black, tipped with white. UNDERSIDE, *both wings* bluish-white, an indistinct

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EXPANSE: *Male*, 1·0 inch. DESCRIPTION: "Allied to *H.* [=*S.*] *nasaka*, Horsfield, and *H. chandrana*, Moore. [MALE.] UPPERSIDE, *both wings* dark brown, lower discal areas violet-blue. UNDERSIDE, *both wings* brownish-grey. *Forewing* with a white-bordered brown band crossing the end of the cell, a broken similarly-bordered discal band, and a marginal row of lunular spots. *Hindwing* with a white-bordered black subbasal anterior spot, and [one] two [or three] similar spots in the middle of the cell, a white-bordered brown band at the end of the cell, a broken zigzag similar discal band, and a marginal upper row of five annular spots; the three lower marginal spaces ochreous-red, the anal and third with a black medial spot, and the middle with a silver streak, these three anal spaces being bordered above by a silver line." (*Moore*, l. c. in Proc. Zool. Soc. Lond.) The alliances of this species are obvious enough; it would have been more useful had Mr. Moore stated how *S. grotei* differs from *S. chandrana*. The locality given for the species is extremely vague.

* *Sinthusa amata*, Distant, Rhop. Malay., p. 461, n. 2, pl. xliv, fig. 20, *female* (1886). HABITAT: Penang. EXPANSE: *Female*, ·95 of an inch. DESCRIPTION: "FEMALE. UPPERSIDE, *both wings* dark brown. *Hindwing* with an anal angular pale greyish patch with a violaceous tinge;—the patch is narrower and extends farther upwards than in *S. amba*, Kirby, and is separated from the posterior margin; *tail* greyish-white with a black medial line. UNDERSIDE, *both wings* pale greyish. *Forewing* with the apex and outer margin ochraceous; and with two ochraceous fasciæ, the first short at the end of the cell, the second much dislocated, and almost crossing the wing beyond the cell. *Hindwing* with a short disco-cellular fascia at the end of the cell, followed by a curved series of seven spots crossing the wing, and an oblong spot at the anal angle,—all these spots dark ochraceous, margined with blackish,—two broken and obscure dark narrow marginal fasciæ, a black spot with some metallic bluish scales between the two lower median nervules, and another spot almost entirely metallic bluish at the anal angle, both these spots being inwardly margined with ochraceous. *Body* and *legs* more or less concolorous with the wings." (*Distant*, l. c.) Probably described from a single specimen. The discal band on the underside of the hindwing being broken up into well-separated spots appears to be the chief characteristic of the species. This is also a noticeable feature in *S. malika*, Horsfield, but in that species the spots are all very small and well-separated according to the figures of it, and there is a prominent series of marginal spots to the hindwing from the third median nervule to the apex, which appear to be entirely absent in *S. amata*. Both species appear to have the apex and outer margin of the hindwing on the underside differently coloured from the rest of the wing, in *S. chandrana*, Moore, the ground-colour is the same throughout.

submarginal dusky band, a discal macular broken ochreous band outwardly defined finely with black, a short similar band on the disco-cellular nervules. *Forewing* with the discal band composed of three distinct portions, the upper composed of three spots, the middle of two, which are shifted a little inwards, the lower portion of one spot also shifted inwards, placed in the submedian interspace. *Hindwing* with the discal band composed of three pairs of spots from the costa, then three or four single spots recurved to the abdominal margin ; the inner portion of the submarginal band bearing a bright yellow line from the second median nervule to the abdominal margin, the anal lobe black, a small round black spot on the margin in the first median interspace surrounded with brilliant metallic blue scales, a few of these scales in the submedian interspace. *Body* black above, bluish-white below.

Described from a single example obtained by Mr. A. V. Knyvett on Observatory Hill, 7,500 feet, in the station of Darjiling, on the 20th June, 1888. The markings of the underside are remarkably like those of a *Chliaria,* but the species has only one tail, and an additional subcostal nervule to the forewing.

The figure shews both sides of the male above described in the collection of Mr. A. V. Knyvett. Since the above was written, Mr. Knyvett has obtained a second male specimen, which he has generously presented to me, Mrs. Wylly has captured a single female, which now adorns my collection, and Mr. H. J. Elwes kindly sent me out the type specimen to examine.

The eleventh division that I have made in the Indian *Lycænidæ* I have called the *Liphyra* group. It contains a single most anomalous genus, which has four subcostal nervules to the forewing in both sexes, as in the Indian genera *Zarona,* mihi, and *Dacalana,* Moore. It is also the giant of the family, the wings expanding over three inches. It is quite an ugly butterfly, but makes up for its want of beauty by its extreme rarity and its interesting structure. It occurs in Sikkim, Assam, the Malay Peninsula and Archipelago.

Genus 176.—LIPHYRA, Westwood. (PLATE XXIX).

Liphyra, Westwood, Proc. Ent. Soc. Lond., third series, vol. ii, p. 31 (1864); id., Distant, Rhop. Malay., p. 204 (1884) ; *Sterosis,* Felder, Reise Novara, Lep., vol. ii, p. 219 (1865).

"BODY, short, thick ; *head* medium ; *eyes* large [smooth] ; *palpi* minute, oblique, scarcely visible from above, the last joint oval, the apex acute ; *antennæ* straight, the apical half gradually clavate ; *legs* very short, thick, all six equal, perfect, the tibiæ all without spurs, the claws of the tarsi entire, not bifid, the pseudonychiæ conical, the pulvillus subbilobate. WINGS, large, obtuse, without tails. FOREWING, with the *subcostal nervure* four-branched, two branches before the apex of the discoidal cell, and two others equi-distant between the cell and the apex ; *discoidal cell* closed. HINDWING, with the *costal margin* angulate ; *discoidal cell* terminated in an acute angle." (*Westwood,* l. c.)

"HEAD rather large. *Palpi* scaly, rather slender, with the second joint very slightly extending in front of the head. *Antennæ* very thick, rather short, gradually thickened. WINGS with large wide-spread scales, even and not tailed, quite entire, with rather long *cilia* (especially to the hindwing at the anal angle). FOREWING, with a rather narrow *discoidal cell,* reaching beyond half way up the costa, with the *costal margin* very straight, especially at the base ; with the *costal nervure* very straight, the *subcostal* nervure closely approaching to it, four-branched (in the female), with the third and fourth branches emitted at some distance beyond the end of the cell, the terminal part of this nervure running out to the exterior, *i.e.,* apical margin ; with the superior [*upper*] *discoidal nervule* arising from the subcostal nervure beyond the end of the cell, the inferior [*lower discoidal*]—very close to the discoidal fold which is very well defined—issuing from almost the middle of the transverse [disco-cellular] nervule. HINDWING, very much folded along the internal margin, and covered densely above with scaly hairs ; with the *costal margin* scarcely two-thirds the length of the internal margin, the *internal* margin very sinuate below the middle ; with the *costal nervure* very straight after its basal curvature, ending at the very apex of the costal margin ; the *discoidal cell*

reaching the middle of the wing, much produced at its inferior [lower] angle ; the *first subcostal nervule* rather close to the end of the cell ; the primary [*costal*] *nervure* bent at its origin ; the *median* nervure distinctly bent at the origin of the second branch. *Thorax* slightly convex ; *abdomen* (of the female) rather short and very stout ; *legs* short, very thick, hind tibiæ nearly equal to the femora, hind tarsi very stout, shorter than the tibiæ."

"The most remarkable form in the family, owing to the extraordinarily powerful structure which distinguishes all the parts ; it reminds one of the *Castniidæ* in respect to the scales, however it is most nearly allied to the genus *Amblypodia*, Horsfield." (*Felder*, l. c.)

"BODY, very short and robust ; *legs* robust ; *eyes* large ; *palpi* minute ; *antennæ* gradually thickened from the middle to the apex. FOREWING, subtriangular, *costal margin* oblique and slightly arched ; *outer* margin convex ; *inner* margin sinuated and coarsely hirsute ; *costal nervure* extending to about the middle of the costal margin ; *first subcostal nervule* emitted a little distance beyond the middle of the cell, *second* subcostal emitted at about half the distance from the apex of the cell as its base is from that of the first subcostal ; *third* and *fourth* subcostals bifurcating at about one-third the distance between the end of the cell and the apex of the wing ; base of the *upper discoidal* nervule united with the subcostal nervure a little beyond the end of the cell ; *disco-cellular* nervules robust, slightly concave. HINDWING, somewhat elongately ovate ; *posterior margin* rounded and convex ; *costal nervure* extending to about the apex of the wing ; *first subcostal nervule* emitted at about one-third before the end of the cell ; *discoidal cell* very broad ; *second* and *first median nervules* with their bases twice as wide apart as the distance separating the bases of the third and second."

"This unique genus is known only by one species, which is probably the largest and most robust butterfly found in the whole of the *Lycænidæ*. Its geographical area can at present be only estimated by that of its sole representative." (*Distant*, l. c.)

In the forewing the costa is gently arched, the outer margin from the apex of the wing to the termination of the third median nervule is almost straight, very slightly convex, then in the male cut out between the apices of the third and first median nervules, then straight to the anal angle, in the female the outer margin is slightly convex from the apex of the third median nervule to the inner angle ; inner margin slightly bowed outwards near the base ; the costal nervure terminates well beyond the apex of the discoidal cell, the second subcostal nervule has its base about equidistant between the bases of the first subcostal and upper discoidal nervules, the third subcostal has its origin exactly midway between the base of the first subcostal nervule and the apex of the wing, the fourth subcostal is short and originates midway between the base of the third subcostal and the apex of the wing ; the terminal portion of the costal nervure ends on the outer margin below the apex of the wing ; the upper discoidal nervule is given off from the subcostal nervure a little beyond the apex of the cell ; the discoidal cell is very narrow ; the disco-cellular nervules nearly erect, but the lower disco-cellular is suddenly bent outwards near its posterior end, and is rather longer than the middle disco-cellular ; the bases of the median nervules equidistant, the third from the lower end of the cell. Hindwing with the costa strongly angled one-third from the base, thence straight to the apex which is acute, the outer margin evenly rounded, the abdominal margin excavated above the anal angle, giving the wing a somewhat lobed appearance ; the discoidal cell is very broad, divided into two unequal portions, the anterior the smaller, by a strong fold which joins the upper disco-cellular nervule a little posterior to its middle, the upper disco-cellular very concave, a good deal shorter than the lower, which latter is strongly outwardly oblique ; the second median nervule has its origin a little before the lower end of the cell.

Professor Westwood and Dr. Felder in their original diagnoses of this genus distinctly say that there are four subcostal nervules (with both of whom I agree in not counting the terminal portion of the subcostal nervure as an additional subcostal nervule) to the forewing, while Mr. Distant (Rhop. Malay., p. 197), who counts the terminal portion of the subcostal nervure as

an additional subcostal nervule, says there are four only instead of five as there are clearly in both sexes if the terminal portion be counted. This character is only possessed, as far as I know, by the genera *Zarona*, mihi, *Dacalana*, Moore, and *Deramas*, Distant, but of the last one sex (the male) only is known. The males of the genera *Amblypodia*, Horsfield, *Iraota*, Moore, *Zesius*, Hübner, and *Neocheritra*, Distant, all have four subcostal nervules, but the females have only three. The origin of the upper discoidal nervule of the forewing from the subcostal nervure *beyond* the apex of the discoidal cell occurs in both sexes of six genera only of Indian *Lycænidæ*, and in the male only of one other genus. The great size of the only known species of the genus, which is the giant of the *Lycænidæ* ; its extremely short and robust abdomen, which, in the dry insect, hardly reaches beyond half the abdominal margin of the hindwing ; the minute palpi ; the thick, short legs ; the very robust antennæ ; the coarseness of the scales on the wings ; and lastly the very moth-like appearance of the insect altogether render it quite unique amongst Indian *Lycænidæ*. It is extremely rare, though its range is very great; and nothing is known, I believe, about its habits or life-history.*

1019. **Liphyra brassolis**, Westwood. (PLATE XXIX, FIG. 243 ♀).

L. brassolis, Westwood, Proc. Ent. Soc. Lond., third series, vol. ii, p. 31 (1864) ; idem, id., Trans. Ent. Soc. Lond., 1888, p. 470, n. 11 ; id., Butler, Trans. Linn. Soc. Lond., Zoology, second series, vol. i, p. 546, n. 1 (1877) ; id., Distant, Rhop. Malay., p. 204, n. 1, pl. xxii, fig. 18, *female* (1884) ; id., Staudinger, Ex. Schmett., p. 269, pl. xciv, *male* (*nec* female) (1888) ; *Sterosis robusta*, Felder, Reise Novara, Lep., vol. ii, p. 219, n. 237, pl. xxvii, figs. 10, 11, *female* (1865).

HABITAT : Assam, Singapore, Northern Celebes (*Westwood*) ; Dodinga, Halmaheira (=Gilolo), (*Felder*) ; Sarawak (Borneo), Sikkim (*Coll. Hewitson*) ; Malacca (*Butler*) ; Sungei-Ujong, Malay Feninsula (*Holland*).

EXPANSE : ♂, ♀, 2·7† (*Distant*), 3·25 (*Westwood*), 3·05 (*Felder*), 3·10, Sikkim and Assam specimens.

DESCRIPTION : MALE. "Fuscous. *Forewing* black, a large hastate interno-basal patch, and a small subquadrate discoidal spot fulvous. *Hindwing* fulvous, with the border and four small spots on the disc black."

"This species, although presenting all the general appearance of a species of the Brazilian genus *Brassolis*, Fabricius, in its robust body and wings and in the coloration of the latter belongs to the *Lycænidæ*, having the veins of the forewing arranged as in [the male of] *Amblypodia* [*Iraota*] *timoleon*, Stoll." (*Westwood*, l. c.)

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* Mr. Doherty in a paper to be published hereafter describes the egg of *Liphyra* as follows :—"Very unlike that of other *Lycænidæ*, but shows an unexpected resemblance to that of *Logania*, Distant, and *Taraka*, Doherty, MS. It is of great size, green, overlaid with white, shaped something like a section or "drum" of a Doric column, but somewhat widest at the base, the height, breadth at apex, and breadth at base being to each other as 9, 13, and 15½. The top is marked with hexagonal reticulations, the lines turbinate in the middle, the margin deeply channelled, and then strongly carinate, the carina projecting both upwards and outwards, white, its contour even. Base also obscurely carinate. Sides crusted with white and minutely indented, with about forty-five vertical ribs, slightly irregular and even (very rarely) anastomosing, extending also over the outer part of the base, the inner part being green and minutely reticulated with hexagons. The prehensores I do not know."

"*Liphyra brassolis* flies slowly with a distinct humming sound, and an uncertain circling flight, hesitating a long time before alighting. Whether it is, as it seems, a protected species, or whether, as I believe, it flies chiefly at twilight and so escapes capture, I do not know. No one would ever take it for a butterfly ; few moths are more typically moth-like in flight. It is probably the oldest type of lycænid existing, and unconnected with the rest, except through such primitive dwarf forms as *Taraka* and the smaller *Gerydinæ*. It is the only Asiatic representative of the subfamily *Liphyrinæ*, Doherty, and its nearest allies are apparently African."

Dr. W. J. Holland has kindly sent me an interesting note he published in the "Canadian Entomologist," vol. xix, p. 61 (1887), in which he suggests that the larva of *L. brassolis* is carnivorous, as a female specimen he had sent him from Sungei-Ujong in the Malay Peninsula "was covered with a whitish mealy deposit, particularly thick upon the abdomen," which substance he found on examination under a microscope to be the same as that which covered some "mealy bugs" he received at the same time, and which were caught on the same occasion as the butterfly. Dr. Holland arrives at the conclusion that his butterfly when caught "was engaged in oviposition," and that the mealy deposit "is nothing else than fragments of the white covering of the scale insects, over and among which the butterfly had been flying while engaged in the act of laying her eggs." He was led to this conclusion by the fact that *Feniseca tarquinius*, Fabricius, in America, is known in the larva state to feed on *Coccidæ*. Dr. Holland states that *F. tarquinius* is closely related to *L. brassolis* in the "form of its wings, their neuration and their colour." The neuration of the two genera is however, widely different, as *Feniseca* has only three while *Liphyra* has four subcostal nervules to the forewing.

† The specimen figured by Mr. Distant measures 3·15 inches in expanse.

"FEMALE. UPPERSIDE, *both wings* reddish-ochraceous. *Forewing* with a large spot occupying the apical two-thirds of the cell and extending beyond it ; two large spots beneath the apex of the cell divided by the second median nervule, the apex and outer margin broadly and the inner margin narrowly for half its length fuscous or black ; extreme outer margin castaneous. *Hindwing* with five discal spots, one inside and two just beyond the cell, and two divided by the second median nervule, and the posterior margin broadly and inwardly sinuate, fuscous or black ; extreme outer margin castaneous ; abdominal margin somewhat darker. UNDERSIDE, *both wings* paler. *Forewing* with the discal black spots present, but the apex and outer margin only mottled with brownish. *Hindwing* with the posterior two-thirds and the costal margin mottled with brownish, the black discal spots obsolete. *Body* and *legs* more or less concolorous with the wings, *eyes* black, *antennæ* brownish. MALE. UPPERSIDE, *both wings* with the black markings larger and more distinct. *Forewing* with the black markings occupying the whole of the inner margin." (*Distant*, l. c.)

Mr. Otto Möller possesses three Sikkim specimens, a male taken in August and two females, one of which was taken in July. The MALE on the UPPERSIDE of the *forewing* is black, with a small orange spot beyond the end of the cell, a large orange patch from the base occupying the lower third of the cell, the whole of the submedian interspace as far as the middle of the first median nervule, then descending obliquely to the inner margin, orange. *Hindwing* black, the costa broadly ochreous, the disc of the wing orange, bearing a large black patch almost filling the cell, two oblong ones beyond it divided by the discoidal nervule, and two others divided by the second median nervule ; abdominal margin pale. FEMALE. UPPERSIDE, *both wings* orange. *Forewing* with an elongated black cell-streak touching the subcostal nervure, extending beyond the cell, narrow at the base, widening out and occupying the whole of the outer end of the narrow cell ; below this streak is an irregularly oval-shaped black spot divided by the second median nervule, the outer margin broadly black, the black colour ascending a short distance up the veins, the inner margin also outwardly black. *Hindwing* with the outer margin coarsely sprinkled with black scales, a small black spot at the middle of the outer end of the broad cell, and four spots outside the cell much as in the male but smaller. The specimens figured by Felder and Distant are both females, the latter has the black markings on the upperside of the hindwing considerably reduced, and is altogether much paler than the Gilolo specimen. There is something altogether *outré* and peculiar about this species ; it is not unlikely that its life-history when known will be as remarkable as is the structure and general appearance of the imago.

The figure shows the upper and undersides of a female specimen from Sikkim in the collection of Mr. Otto Möller.

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[Specific names are printed in small type (abdul) ; specific synonyms and varieties in italics (*abseus*) ; generic names in small capitals (ABISARA) ; generic synonyms in small capital italics (*AMBLYPODIA*); subfamily and family names in large capitals (CASTNIIDÆ) ; and subfamily and family synonyms in large capital italics (*AMBLYPODINÆ*). The number of the page on which a species or variety, genus, subfamily or family is described is printed in italics.]

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ERRATA.

Page 11, seven lines from the top, omit sentence commencing "In India" and concluding with "*Z. ziha*. Hewitson."

Page 16, three lines from the top, for "*." read "†." Also eleven lines from the bottom, for "third" read "first."

Page 17, sixteen lines from the top, after "except Drina," add "and some species of *Zephyrus*."

Page 64, fourteen lines from the bottom, for "*Palpi* exactly half" read "*Antennæ* exactly half."

Page 184, eighteen lines from the bottom, for "Dry-seasan," read "Dry-season."

Page 189, twenty-two lines from the bottom, for "*thetys*," read "*thetis*."

Page 225 sixteen lines from the bottom, for "*Mathahala*" read "*Mahathala*."

Page 248, four lines from the top, after "**Arhopala rafflesii**, n. sp," add "(FRONTISPIECE, FIG. 136 ♂)." Also twenty-nine lines from the bottom, for "*adtaha*" read "*adatha*"

Page 249, after line twenty-three, from the top, add "The figure shows both sides of a male specimen from Singapore in the Raffles Museum, Singapore."

Page 340, seventeen lines from the top, for "ICITAS," read "ICETAS."

Page 363, five lines from the top, for "*lazalaria*," read "*lazularia*."

NOTE.—Volume III, containing the title page, list of illustrations of Vol. III, preface, and pp. 1—503, with Frontispiece to Vol. III, and plates XXV—XXIX, was published in February, 1890.

END OF VOL. III.

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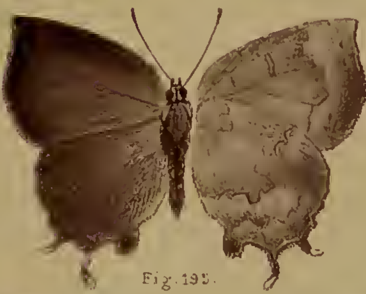
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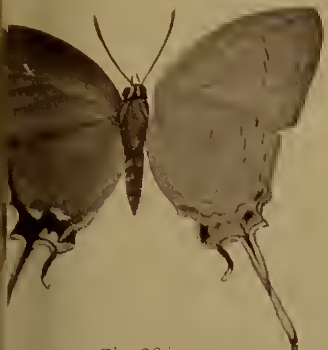

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